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MEDICAL AND SURGICAL REPORTS

OF

THE BOSTON CITY HOSPITAL.

Fourteenth Series.

EDITED BY

HERBERT L. BURRELL, M.D., W. T. COUNCILMAN, M.D.,
AND CHARLES F. WITHINGTON, M.D.

BOSTON:
PUBLISHED BY THE TRUSTEES.
1903.

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PREFACE.

The report is now established as an annual publication, the manuscript for it being due on October 1st of each year, and with the co-operation of the contributors the editors hope to be able to issue the report on December 1st of each year.

The illustrations and binding of this report have been paid for by a sum of money placed at the disposal of the editors by the Boston City Hospital Alumni Association.

The Editors.

December 1, 1903.

A LIST OF THE TRUSTEES, THE MEDICAL AND SURGICAL STAFF, AND THE HOSPITAL OFFICERS.

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I.

MENTAL CONDITION BEFORE OPERATION.

By David W. Cheever, M.D.

There is an ill-defined something called "vital resistance." When perfect it constitutes immunity. It is of varying degree. When feeble the patient succumbs to a trivial injury; when strong he is hard to kill. It is indissolubly connected with the mental state; fortitude and strong vital resistance; apprehension and enfeebled vital resistance; terror and no vital resistance. When we speak of shock we mean something more than varying blood pressure or vaso-motor paralysis. These are results, first, of injuries and pain; second, of reflexes from the mental state, as fear.

There are, then, two shocks, (1) that due to bodily mutilation; (2) that finer and less easily recognized shock which depends on nervous shrinking from fear, or a paralysis of will. All this is real, if obscure. Again, the sick mind differs from the well mind; imagination is quickened; reason put behind; fear magnifies and distorts; ghosts seem real. And it is always with the sick mind — more or less sick — we have to deal. Sick from exhausting disease; worn with pain; apprehensive from dwelling on a morbid growth, or the result of an injury. The influence of fear is of less consequence in children; they do not anticipate, and they forget. The adult does neither. The old person makes the evils of anticipation far more than the reality. In the elderly, apprehension before an operation sometimes leads to insanity after one.

We know the effect of fear and shock in battles, conflagrations, sieges, shipwrecks, in unhinging the mind and making many insane.

Fear kills outright; numerous cases are on record. Mental depression kills the mother of the child of shame. So the sick mind, already enfeebled, if lacking in fortitude, depresses the vital resistance and leads to unexplained death. Those who enter on an operation, convinced they cannot survive it, frequently do not. We recall a case where the patient was in abject terror before an operation, and who never rallied after it, and died in thirty hours.

Before etherization she lay curled upon her side, with her eyes closed and her fingers in her ears. She said she had been so for hours. Stimulated with alcohol; reassured and promised, she persisted; and it was thought wiser to put on the ether sponge, as on a child.

The operation was well and rapidly and safely done; the ether worked well; immediate paralysis of all peristalsis and assimilation ensued, and she perished.

Again, a strong person was assured after three days' illness that an incision to remove an appendix was necessary. Four surgeons and her physician concurred.

She declared she should never get well if operated on. She died in sixty hours. There was an autopsy. There was no evident sepsis, no peritonitis, no organic disease; the cause of death unexplained. The operation was not thirty minutes, and there was nothing remarkable about it. Vomiting, sinking, collapse, led to the fatal result.

Some years ago the writer had to deal with a case of unreasoning, childish terror in a young woman with a tumor of the breast. The operation was simple, the wound healed kindly, but the patient's mental condition remained impaired.

A quite old woman had scirrhus of the breast. The writer advised a simple and rapid excision; others insisted on a long dissection of the axilla. The latter course was pursued; senile dementia followed the operation.

How can we deal with such people? Reassure, humor them, of course; refuse operations of expediency in such

cases ; be sure we have an operation of necessity ; call in the offices of the church, valid and successful in allaying fear in proportion to faith. One must enter on an operation, where there is unreasoning dread, with great apprehension.

Probably the patient will die. We must be clear that he will die if not operated on.

II.

RELAPSE IN PNEUMONIA.

By A. Lawrence Mason, M.D.

While relapse in typhoid fever occurs in 10 per cent. or more of the cases, an analagous condition, interrupting convalescence in pneumonia, is very rare. It is necessary here only to allude to the deceptive pseudo-crises, and to the various complications within the lung, pericardium, and pleura, which may prolong the course of pneumonia. In the absence of these conditions there are still a few cases in which, after complete crisis or lysis, a fresh consolidation occurs and runs its course, often in the opposite lung. The signs of delayed resolution, abscess, and empyema are found in the side originally affected, and when the pneumonic process extends, as it often does during the progress of the disease, to a second or a third lobe, there is no intervening crisis, though there may be a partial lysis.

Therefore we may consider a true relapse as occurring, when, after a completed crisis or lysis, and after an interval of convalescence, as indicated by increasing strength, abated symptoms, and clearing physical signs, a fresh attack comes on and runs its course as before. The immunity that usually follows the primary attack has not been attained. It is noteworthy, however, that, although relapses in pneumonia are very uncommon, second, third, and fourth attacks during a lifetime are not rare; whereas the greater persistence of the typhoid germ, which tends to cause frequent relapses, also confers a much greater degree of immunity in after life, second attacks of typhoid being seldom observed.

In a previous investigation[1] I could find but two such

[1] On Second Attacks of Typhoid Fever, Boston Med. and Surg. Journal, Vol. 130, p. 180.

cases that could be properly verified among several thousand hospital cases of typhoid fever, although, doubtless, such recurrences are more frequent than my research would indicate.

Relapse in pneumonia has been discussed by many writers in the past century with considerable diversity of opinion. Some of the best authors pass over the subject with little or no reference.

Grissolle[1] states that he observed relapse in 4 per cent. of his cases; Briquet in 20 per cent. But this was before the days of medical thermometry.

It was not until 1850 that febrile temperatures were carefully noted by von Bärensprung[2] and Traube, and the work of the latter on "The Effects of Digitalis" and on "Crises and Critical Days"[3] marked a new departure in clinical study.

Only in 1868 did the classic work of Wunderlich "On the Temperature in Diseases" appear. This author gives interesting charts of pseudo-crisis and of relapse in pneumonia.

Ziemssen recorded two cases of relapse in which, twenty-four hours after crisis, second and third lobes were invaded, but, from the short interval, they seem more like cases of pseudo-crisis than of true relapse.

Wilson Fox[4] says: "Even after the crisis has distinctly appeared relapses may occasionally occur. They are not always distinguishable from the pseudo-crises previously mentioned or from the condition described as 'pneumonia migrans.' They are usually attended by distinct signs of a fresh invasion of the disease, and they are marked by a sudden rise of temperature from the normal or subnormal standard previously attained.

"They are most common within the three or four days succeeding the crisis. I have, however, known a relapse to take place as late as the sixteenth day, when the temperature had been natural since the eighth day. The duration of the

[1] Traité de la Pneumonie. 1840.
[2] Müller's Archiv. 1851-52.
[3] Charité Annalen, 1850. I., 622. Deutsche Klinik. 1851-52.
[4] On diseases of the Lungs and Pleura. 1892. p. 321.

pyrexia in the second attack was only two days. Its duration is commonly shorter than that of the primary attack, usually terminating within three or four days, but cases are recorded where even a third relapse has ensued."

Osler (Practice of Medicine: 1892) says: "Relapse in pneumonia is so uncommon that some good observers have doubted its occurrence. I have never seen an instance in which I was certain that there was a definite relapse. There are cases in which from the ninth to the eleventh day the fever subsides, and after the temperature has been normal for a day or two a rise occurs and fever may persist for another ten days or even two weeks. Though this might be termed a relapse, it is more correct to regard it as an anomalous course of delayed resolution. Wagner, who has studied the subject carefully, says that in his large experience of 1,100 cases he met with only three doubtful cases. When it does occur the attack is usually abortive and mild."

In a later edition (1899) two cases are mentioned by Osler, as follows:

"In one case with pneumonia of the right lower lobe, crisis occurred on the seventh day, and after a normal temperature for thirteen days he was discharged. That night he had a shaking chill followed by fever, and he had recurring chills with reappearance of pneumonia.

"In a second case crisis occurred on the third day and there was a recurrence of pneumonia on the thirteenth day."

It is not stated whether the pneumonia in these cases involved the same lobe again or another.

Austin Flint is more positive. He says: "A relapse never takes place."[1] Flint's experience was very large, and his powers of observation were unexcelled.

Sears and Larrabee[2] in an analysis of 949 cases of pneumonia admitted to the hospital between 1895 and 1900, found but eight cases of relapse. Two of these died, one from exhaustion two days after the second crisis.

In my own experience of thirty years in hospital practice I have seen but two or three such cases, one of which is

[1] Flint's Practice of Medicine. 5th Edition, p. 173.

[2] Med. and Surg. Reports, B. C. H. 1901.

Case II., reported below. Case I. is from the series collected by Drs. Sears and Larrabee.

The foregoing citations, though not exhaustive, may serve to introduce the cases which follow with their respective charts and brief conclusions.

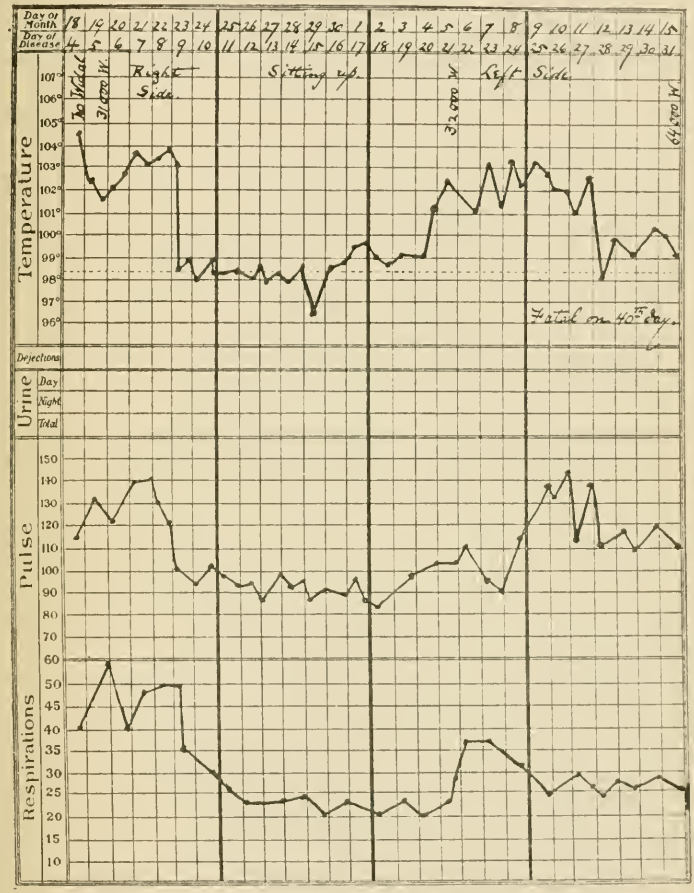

CHART I.

CASE I. RIGHT LOBAR PNEUMONIA; CONVALESCENCE; RELAPSE; DEATH.

J. W., aged 16, was admitted with pneumonia of the right lower lobe. Four days before entrance he was taken with chills, fever, dyspnœa, cough, headache, pain in the right front of chest, and blood-streaked expectoration. His face was flushed and breathing rapid, but the general condition was good. The heart was regular, of good strength and volume. No murmurs.

Physical Signs. — In the right back, from one inch above the angle of the right scapula to the base, bronchial breathing, bronchophony and fine râles were heard. Percussion dullness and increased tactile fremitus were observed. Leucocytes, 31,000.

Three days later the dyspnœa had increased, with dilatation of the alæ nasi, and he was delirious. On the following day, the eighth day of

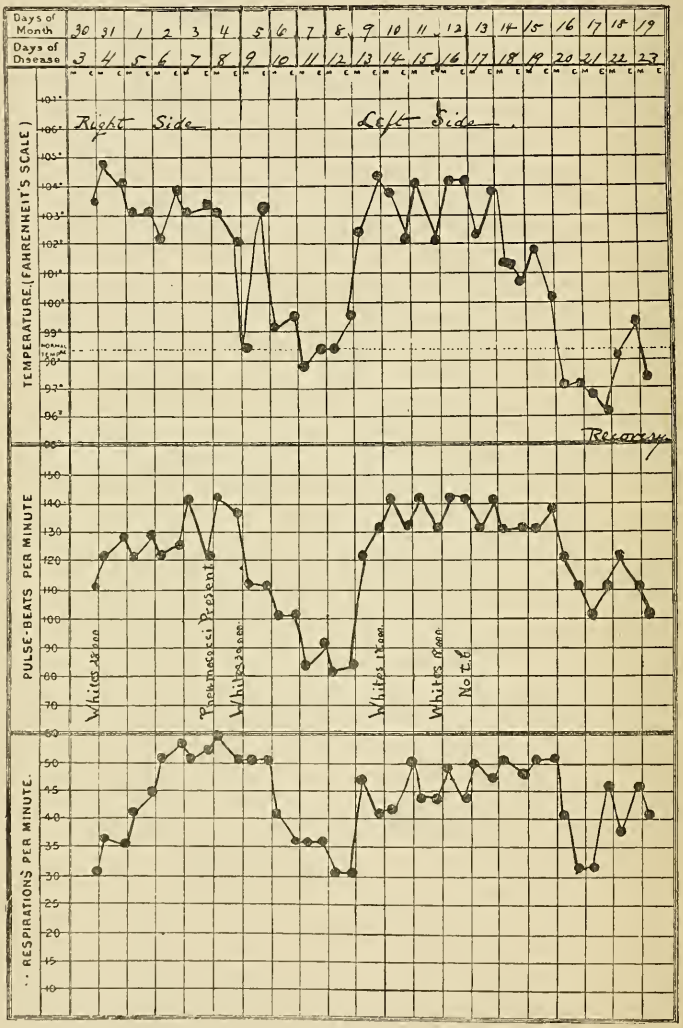

CHART 2.

the disease, crisis took place, with relief to all symptoms. Convalescence went on favorably, and on the fifteenth day the patient was sitting up in chair and blankets, "very comfortable." Respiration still harsh.

Relapse. — Five days later, however, and eleven days after the crisis,

the temperature again rose, and the patient was attacked by pain in the *left* side. Over the left lower lobe dullness, bronchial respiration, and a few crepitations at the end of inspiration were observed. Bronchophony and increased vocal fremitus.

During the following days a typical pneumonia of the left lower lobe developed, while the signs in the right side disappeared except for a few scattered moist râles.

Although the temperature fell to normal on the ninth day of the relapse, the pulse remained at 110 and there was little rallying power. Symptoms of pulmonary abscess developed, but the aspirator failed to discover pus. The patient died on the fortieth day. There was no autopsy.

Case II. Right Lobar Pneumonia; Relapse; Recovery.

A young woman, with good family history, entered the Hospital October 30, 1902, with pneumonia. It was stated that she had had measles with pneumonia eight months before, while pregnant. Three months later a child had been born at term.

Present Illness. — Two days before entrance she had prolonged chill, headache, dyspnœa, pain in the right side, cough, vomiting, and diarrhœa. Sputa, dark and adhesive.

At the time of admission the signs of pneumonia were well developed in the right lower and middle lobes; namely, dullness, bronchial respiration, and bronchophony, increased tactile fremitus, abundant high-pitched râles and a friction rub.

The heart was weak, with a blowing systolic murmur at the apex and a soft diastolic murmur at the base. Cyanosis was marked. Pneumococci were present in the sputa. The blood showed 28,000 whites.

Urine, 1,025; albumen; a few hyaline and granular casts and renal cells. Diazo reaction present on the sixth day, absent seventeenth day.

The disease ran a severe and dangerous course until the ninth day, when there was a pseudo-crisis followed by crisis on the tenth day.

On the tenth, eleventh and twelfth days she became hungry, slept well, and presented all the signs of convalescence, the pulse and temperature remaining normal for two days. This interval enabled her to regain enough strength to carry her through the relapse to follow.

Relapse. — On the thirteenth day the symptoms and physical signs of pneumonia developed in the opposite lung, the left upper lobe being the seat of a new inflammatory process, while the right lung was resolving favorably. This relapse was also characterized by great severity, as the chart shows, and convalescence did not begin until the twentieth day. Resolution progressed rather slowly after the second crisis; there was a good deal of vital depression for some days with a sub-normal temperature, but recovery was uneventful; twenty-eighth day, 14,000 whites. No tubercle bacilli.

CONCLUSIONS.

1. True relapse occurs in pneumonia in less than 1 per cent. of all cases.

2. The relapse may be "abortive and mild," but is oftener severe and dangerous, especially from collapse or complications after the second crisis.

3. Thermometric observations and leucocyte counts for several days after the crisis are important for diagnosis and prognosis.

4. Although we may confidently give a favorable prognosis in cases of pneumonia that safely pass the crisis, a mental exception should be reserved in view of possible relapse.

III.

A CLINICAL STUDY OF ONE HUNDRED AND TWELVE CASES OF MOVABLE KIDNEY.

By Ralph C. Larrabee, M.D.

This paper is based on two hundred and seventy-two patients examined in the Female Medical Out-Patient Department during a four months' service in 1902. The cases were chosen at random, without reference to symptoms, appearance or other evidences of movable kidney.

The patients were examined bimanually in the dorsal position, and any tumor of the proper size, shape and consistency, which could be pushed back into the normal position of the kidney, was accepted as a movable kidney. A few cases which were doubtful on the first visit were re-examined after a cathartic, but most of the negative cases were examined but once. A few only were examined in the upright position as well as in the dorsal. One or two were rejected entirely because satisfactory examination was impossible.

One or both kidneys could be felt in one hundred and twelve, or 41½ per cent., of the two hundred and seventy-two cases studied. High as this figure seems, it was exceeded by that of Godard, Danhieux and Werhoogan,[1] who found 46 per cent., while others have estimated that 60 or even 80 per cent. of all women have movable kidney. The figure resulting from this study is probably too low rather than too high. It is, of course, possible that a distended gall-bladder, a neoplasm or even a mass of fæces may have been occasionally mistaken for a movable kidney,

but it is not likely that this was the case to such an extent as to seriously impair the results. On the other hand, the negative cases include a number of women so obese that a tumor the size of the kidney could hardly have been felt. Besides, since it was impractical to examine the negative cases repeatedly and in various postures, it is likely that a number of cases were overlooked, for a movable kidney often slips back into position when the patient lies down, and cannot then be felt. In more than one instance the kidney was felt by an assistant, who, in the course of his manipulations, replaced it so that it could not be palpated again until the patient was directed to cough or to stand up. It is surprising how often movable kidney is found if it is looked for, and how often it is overlooked unless especially sought. Therefore figures based on the number of cases diagnosed in a general clinic where especial attention is not being paid to this point are of no significance. While it is probably true that the class of women making up our out-patients is especially susceptible, yet if regularly sought for in patients of the better class the condition will be found so frequently and so regardless of the symptoms for which relief is asked that one becomes very skeptical as to its importance in causing illness and suffering.

The right kidney alone was affected in ninety-eight of the hundred and twelve cases. Both kidneys were palpable in thirteen, the left alone in but one. In this latter case the patient had a tubercular process in the right lung. This is of interest, as the X-ray has shown that in phthisis the excursion of the diaphragm on the affected side is limited to the upper portion of its normal range.[2] It is possible, therefore, that in this case the right kidney did not get pushed down far enough to be felt in inspiration. Where both kidneys were felt the right was the more movable in all but three cases, the left not being the more movable in any.

We may somewhat arbitrarily class the cases according to the degree of mobility as — *first*, palpable, where the kidney can be felt only in deep inspiration; *second*, movable, where the organ can be held down during expiration; and

third, floating, where the kidney can be pushed freely about. Thirty-nine cases in this series belong to the first class, forty-nine to the second, and twenty-four to the third. It is a question in how many of the first group the kidney, though palpable, was not abnormally movable. In three of the thirty-nine only the tip of the organ could be felt. In others the whole kidney could be felt, but could not be held down during expiration. In most cases the lower third to two-thirds could be grasped between the examining hands — a degree of mobility that will doubtless be accepted by most as beyond physiological limits.

The frequency at different ages was as follows:

Below 20	21	cases,	of	which	17	per	cent.	had	movable	kidney.
20 to 29, inclusive,	92	"	"	"	45	"	"	"	"	"
30 to 39 "	65	"	"	"	52	"	"	"	"	"
40 to 49 "	40	"	"	"	43	"	"	"	"	"
Over 50	36	"	"	"	42	"	"	"	"	"

This agrees with the results of others in placing the occurrence as being most frequent in young adult life, but there were five cases over sixty years of age and one over seventy. It seems probable that, as Wolkow and Delitzin,[3] Mathieu [4] and others state, movable kidney is not rare in old age. The slight decrease in old people may be due to the leaving off of corsets or to the common increase of flesh after the menopause.

Children were not included in this series. In another series, however, of thirty-seven children, ten boys and twenty-seven girls, systematically examined in the children's room of the Boston Dispensary, there occurred three cases, of which two were very slight or doubtful (one boy and one girl). The third, a girl of seven had a right kidney which was easily felt, but which did not appear to be causing symptoms. This is in marked contrast to the work of Rosenthal,[5] who was able to feel the kidney in 50 per cent. of the girls examined and in 10 per cent. of the boys.

But four nationalities were represented in sufficient numbers to justify mention. Of ninety-three Americans 37 per cent. had movable kidney, of sixty-nine Irish 51 per

cent., of forty-one natives of the British Provinces 49 per cent., and of twenty-two Russian Jews 36 per cent.

The conditions of married life do not seem, according to this study, to favor very notably the occurrence of movable kidney, since it was found in 41 per cent. of the single women and in 44 per cent. of the married and widowed. Notes as to the number of pregnancies were made in one hundred and seven of the positive cases with the following results:

Never pregnant	51
One pregnancy	6
More than one pregnancy	50

It is unfortunate that no record of the number of pregnancies was kept in the negative cases for comparison, as authorities differ so widely on these points. Some, including Senator,[6] state that women who have borne children are especially susceptible, while others, like Hilbert,[7] Kuttner,[8] and Küster,[9] deny any such influence. According to Mathieu,[4] it is commoner in women who have borne children than in those who have not, but commoner in those who have had but one child than in those who have had several. In thirty-six of the married women here studied, an effort was made to determine the relation of the lesion to the frequency of pregnancy. It was found that seventeen of the thirty-six had been pregnant four or more times at average intervals of less than two years, and that fourteen had given birth to six or more children.

The cases here reported show strikingly the effects of emaciation as a causal factor, for 66 per cent. of the patients in whom movable kidney was found said that they had lost weight, though such statements were often not supported by objective evidences. The accompanying table, based on the one hundred and sixty-six cases in which the notes mentioned the state of bodily nutrition, shows that the condition is much more common in thin people:

Obese	6	had	movable	kidney,	27	did	not.
Well-nourished	34	"	"	"	43	"	"
Fairly-nourished	19	"	"	"	13	"	"
Poorly-nourished or emaciated,	19	"	"	"	5	"	"

The comparative rarity of the condition in the obese may be due in part to the difficulty of feeling the kidney, even though much lower than normal. It will be observed that, although a much greater proportion of the poorly-nourished than of the well-nourished showed movable kidney, yet over a half of the positive cases were of the latter class. Indeed, it was striking how many plump, healthy-looking young women possessed movable kidneys.

Trauma was given as probable cause in but one case, the patient dating her symptoms to a fall four years before. She also had a retroverted uterus. In no case was the movable kidney a consequence of surgical operation, all of the six cases showing laparotomy scars being on the negative list. But four out of fourteen patients who said that they had had operations on the pelvic organs showed movable kidney. Forty-four of the positive cases complained of cough, often slight.

All but nine patients wore corsets or other constrictive articles of clothing. Efforts to classify them according to the kind of corsets or to determine the effects of tight lacing were unsuccessful.

As to the diseases which brought these patients to the hospital it was noted that conditions accompanied by wasting or impairment of nutrition presented the largest percentage of movable kidney. Fifteen cases of phthisis out of twenty-seven had it; anæmia and chlorosis, twelve out of twenty-five; chronic gastric indigestion, seven out of twelve; cancer, three out of five; neurasthenia, five out of eleven. Movable kidney appeared to explain the symptoms in but eight of the one hundred and twelve cases in which it was found. The diagnosis was "enteroptosis" in eight others. Thus ptosis of the kidney, alone or with other organs, was considered to be the cause of the symptoms complained of in but 14 per cent. of the patients presenting the lesion. This agrees closely with the work of Hilbert,[7] according to whom symptoms arise in 15 per cent.

The study of the symptoms is based on all one hundred and twelve positive cases and on one hundred and fifty of the negative ones. Taking the symptoms most commonly

attributed to movable kidney, we have the following results: *First* — Pain in the back or lumbar region was present in eleven positive and fourteen negative cases. *Second* — Abdominal pain in twenty-one positive and thirty-one negative cases. *Third* — Throbbing in the abdomen in one positive case (an aneurysm) and in one negative case. *Fourth* — A sensation of a tumor slipping about in the abdomen in three positive cases. *Fifth* — Dragging or undefined discomfort in the abdomen in two positive cases and in one negative case. *Sixth* — Dyspepsia in forty-one positive and forty-six negative cases. *Seventh* — Acute crises of severe abdominal pain in four positive and two negative cases. *Eighth* — Jaundice in one negative case. *Ninth* — Neurasthenia and kindred neurotic conditions in seventeen positive and eighteen negative cases. *Tenth* — None of these symptoms in forty positive and fifty-three negative cases. The conditions of the bowels are shown in the following table:

Constipation.	Positive cases,	48	per cent.	Negative cases,	49	per cent.
Diarrhœa.	"	"	2	"	"	"	4	"
Normal Bowels.	"	"	50	"	"	"	47	"

This study, then, does not indicate that any symptom or class of symptoms is particularly characteristic of movable kidney. The only symptom peculiar to positive cases, viz., a sensation of a lump in the abdomen, was too rare to possess much significance. It should be said that these histories were not obtained by asking "leading questions" after the kidney had been discovered; they were merely the symptoms described to the assistants in taking the histories in the usual routine way.

The condition of the abdominal wall was investigated in fifty-seven of the positive cases. It was lax in fourteen. Separation of the recti muscles was present in twelve, and was occasionally so marked that a large mass of intestine, and in one case even the artificially distended stomach, protruded. It was not always associated with movable kidney, however, being found in seven of the negative cases, often well-marked. Hernia was noted twenty-one times in these fifty-seven positive cases. The umbilical was the commonest

form — in seventeen cases of such a slight degree as to make its classification as a true hernia doubtful. Two were inguinal, both well-marked and right-sided.

The liver extended below the costal border in thirty of the positive cases. In but two of these was the inferior border also lower than normal. None gave the typical picture of "movable liver," with the extreme right border markedly prolapsed and freely movable. The spleen was palpable in seven of the positive cases. In but one, a case of secondary syphilis, was there anything in the past or present condition of the patient to account for the position of the organ otherwise than as a ptosis of the viscus.

The stomach was investigated with fairly satisfactory results in fifty cases, thirty-six of which showed no abnormality in the gastric area. The greater curvature was below the umbilicus in fourteen. In three of these the depression of the organ was well-marked, while in two, one a cancer of the stomach, there was dilatation. Four out of six cases in which the contents were examined chemically showed decrease or absence of hydrochloric acid and two showed normal acidity.

The pelvis was examined in too few instances and the results were too fragmentary to be of great value, vaginal examination being made but thirty-eight times. Eleven of the eighteen positive cases examined had uterine displacements, while they were present in but six of the twenty negative cases.

Albuminuria was present in eight out of thirty of the cases in which movable kindney was present, and in but three out of thirty-one in which it was absent. It has been claimed that after palpation in cases of movable kidney some blood will always be found in the urine [10]. Although many of these patients were freely palpated by several examiners, gross hæmaturia did not result in any known instance. Microscopical examination of the sediment was not made in enough cases to be of any significance. The hæmoglobin was estimated in sixty-four cases by the Tallqvist method, with the following results:

Above 75 per cent. in 21 positive cases and 18 negative cases.
Between 50 and 75 per cent. in 8 positive cases and 14 negative cases.
Below 50 per cent. in 2 positive cases and 1 negative case.

Thus the association of anæmia with movable kidney was not a marked feature.

In none of these cases was there any evidence of hydronephrosis, gangrene, malignant disease, severe hæmorrhage or other serious complications. Six cases gave histories of periodical attacks of abdominal pain suggesting strangulation or Dietl's crises. Four of the six showed movable kidney. In three of these four there did not seem to be any reason to think that the kidney was responsible rather than one of the other numerous and more common causes of abdominal colic. One, in fact, was probably appendicitis, one gave a history of "gravel," and one showed evidences of pelvic inflammation. The fourth case had been subject for four years to acute attacks of severe, incapacitating pain, beginning in the right lower abdomen, extending to the hypogastrium, and relieved in a few hours by vomiting. The greater curvature of the stomach was two inches below the umbilicus, and hydrochloric acid was reduced. The right kidney was low in the abdomen, freely movable and not fully returnable to its normal position. A swathe gave complete relief for three weeks, after which she was lost sight of. This was the only case in which there was fair reason for attributing the pain to the movable kidney.

Treatment, in the sense of operative or mechanical fixation or support, was considered unnecessary in eighty-seven of the one hundred and twelve positive cases. Such patients were not informed of the presence of the anomaly. In one case where this was inadvertently done symptoms promptly appeared, the patient complaining at her next visit of "jumping sensations" in the lumbar region. Two women were advised to wear different corsets. Twenty-five were advised to wear swathes. These included some where the symptoms could hardly be attributed to the kidney, the treatment being adopted rather for enteroptosis or to support lax abdominal walls. Either a somewhat elaborate bandage or a simple binder of canton flannel

was used. Surgical treatment was not advised in a single instance.

The immediate results can be stated in but five cases. Three of these showed marked improvement, one obtained no relief, and one, a cancer of the stomach, improved temporarily. None of the cases were observed long enough to show the ultimate results.

Some practical inferences, however, may be drawn. If over two-fifths of the women of certain classes have movable kidney one should be very cautious in attributing to such a common anomaly such indefinite symptoms as backache, dyspepsia or neurasthenia — symptoms which, in these cases at least, were as common where no such condition could be demonstrated. When a movable kidney is found it should be borne in mind in treating the case, but, unless there is reasonable grounds for attributing to it the symptoms complained of, it is best not to use any appliance for its support and not to direct the patient's attention to its existence. The frequency and innocuousness of the lesion, as shown by this and similar studies, would appear to refute the extreme surgical view according to which a movable kidney should be operated on with the object of preventing serious complications. The mortality of the operation, according to Keen,[11] may be as high as 2 or 3 per cent. Of one hundred and thirty-seven operated cases collected by Watson,[12] there were five deaths, four of which were not the result of operation. Surely the mortality of movable kidney itself, direct or indirect, is nothing like this. Considering the great frequency of the lesion, complications are rare, especially the more serious ones. Of hydronephrosis and pyonephrosis, but fifteen cases were admitted to the surgical wards of the Hospital in three years out of a total of 11,435 admissions, including cases arising from all causes.[15] Cancer is too rare to need serious consideration, and its ætiological connection with movable kidney is at least doubtful. The acute abdominal crises due to vascular or urethral obstruction from twists or kinks of the pedicle are rarely fatal. The same may be said of the renal hæmorrhages occasionally seen. The cases of the latter condition, collected by Eshner,[13]

appear to have been usually independent of renal mobility, and often recovered after operation, even where nothing had been done other than inspection of the organ.

Two women in this series had been previously operated on for movable kidney. In one a nephrorraphy was done, followed, as the organ was not retained in position, by a nephrectomy. Later she was advised to wear a swathe to support the other kidney. She was markedly neurotic, and stated that the symptoms had not been relieved. During the past year she has been in the hospital at least twice, once to be operated on for appendicitis and once for probable peritonitis. The second patient stated that a sinus had persisted for a year after operation, and that the original symptoms were not relieved. As the notes on this case have unfortunately been misplaced, her statements cannot be verified by reference to the original records. A third case seen in the same clinic since the material for this study was collected had been at the Long Island Hospital for floating kidney, major hysteria, kleptomania and retroversion of the uterus. Both kidneys were sutured through lumbar incisions without marked benefit. Her chief complaint now is pain in the back. She is extremely neurotic and has a well-marked albuminuria. There is severe hyperæsthesia of the abdomen and lumbar regions. Neither kidney can be felt. Thus in none of these three cases was the operation, although in all mechanically successful, attended with marked relief of symptoms, and one at least was injured to the extent of being obliged to take care of a sinus for a year.

Nephrorraphy undoubtedly has its place. Where any of the serious complications, such as hydronephrosis or pyonephrosis or severe crises, are present there can be no hesitation. It is justifiable where there are disabling symptoms that cannot be relieved by simpler means, or even where the patient prefers the risk of operation to the discomfort of a bandage. It should be remembered, however, that the temporary use of the bandage may tide a patient over a period of poor health or debility, during which the symptoms have arisen, and that afterwards, when the patient has returned to a normal state of health or has gained flesh, the kidney

may cease to cause trouble. In all cases, however, but particularly where the symptoms are predominantly nervous, one should not advise operation unless he can attribute the symptoms with reasonable certainty to the lesion, and in the words of Fischer[14], "das ist leicht gesagt aber schwer gethan."

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IV.

DISEASES OF HOUSE OFFICERS.

By Wm. R. P. Emerson, M.D.

The appointment of house officers at the Boston City Hospital is made by competitive examination in which physical as well as medical and personal qualifications are considered. The result is a fairly able-bodied set of men of similar habits and training, well suited to show, both in their general condition and in their physical ailments, the comparative effects of severe and confining work on the three main services of the Hospital, namely, medical, surgical, and pathological.

The records for the past ten years from July 1, 1893, to July 1, 1903, include two years and one month before the present South Department for contagious diseases was established. During this time two months contagious service in Wards A and E were a part of each house officers duty, one month as junior and later one month as house physician or as house surgeon.

Until July, 1896, the appointments were for eighteen months, with no vacation. At this time the service was increased to eighteen months and two weeks, thus allowing a vacation of two weeks before the last six months. At this time also the first pathological house officer was appointed, and the service has so continued unchanged, with two men on duty, one as junior for six months and the other as senior for the same time. In 1898 the medical and surgical services were increased to two years.

The work medical, is chiefly records, laboratory and the repeated physical examinations of non-infectious (so-called) fever patients. The work surgical, is records, surgical dressings, often septic, and operations; the work pathological, is with cultures, especially from the contagious department, the examination of pathological tissues and the making of autopsies.

The following table presents a list of the diseases that have occurred during the house services:

TABLE A.

Diseases of House Officers.

July 1, 1893, to July 1, 1895. During this time each house officer served two months in the contagious service. There was no pathological service.

	Medical.	Surgical.
Influenza	3	..
Tonsillitis	1	..
Diphtheria	2	5
Scarlet Fever	3	2
Measles	1	..
Typhoid Fever	..	1
Gastro-Duodenitis	..	2
Acute Gastritis	1	..
Appendicitis	1	..
Furunculosis	..	1

September 1, 1895, to July 1, 1903 :

	Medical.	Surgical.	Pathological. From July, 1896.
Phthisis Pulmonalis	..	1	2
Pneumonia	1	..	..
Influenza	4	3	..
Tonsillitis	12	8	3
Typhoid Fever	..	1	..
Febriculæ	5	..	..
Scarlet Fever	1	..	1
Diphtheria	..	1	..
Vaccinia	..	1	..
Gastro-Enteritis	2	1	..
Gastro-Duodenitis	2	..	..
Acute Gastritis	1	..	..
Acute Articular Rheumatism	1	..	..
Acute Otitis Media	2	1	..
Furunculosis	1	4	..
Septic Hand	..	1	1
Septic Thumb	..	2	1
Septic Arm	..	2	1
Teno-Synovitis	..	2	..
Acute Sinusitis (Antrum Highmore)	..	1	..
Gas Poisoning	..	2	..
Appendicitis	1	2	1

The above table does not include a certain number of mild cases, not entered on the records, in which house officers were cared for in their own quarters without being off duty.

The first part of the table shows practically no difference, medical and surgical, when both served on the contagious service.

The small number of entries during this time is accounted for by the fact that there were but two men on each service, therefore a man did not go off duty unless actually obliged to do so, as he would thus leave but one man to do the work. Later with three men on duty, to leave the service for a few days would cause injustice neither to the patients nor to his fellow house officers.

The second part of the table shows a greater number of naso-pharyngeal affections and of affections attended by fever on the medical side, and of local septic infections on the two other services. The proportion of naso-pharyngeal affections and of affections attended by fever, medical as compared with surgical, is two to one.

FEBRICULÆ.

These affections have occurred on the medical side exclusively, often of not sufficient severity as to require admission to the service. The following record illustrates these cases.

On October 27, 1899, Dr. A. began to have malaise, slight headache, and fever. These symptoms continued five days, increasing somewhat in severity. He kept about work until the fifth day when his temperature was found to be 104. Upon being put to bed and sponge baths given his temperature dropped to 100. A four-hourly chart was kept and baths given when his temperature was 102.5 or higher. Six baths in all were required. His temperature subsided by lysis and was normal on the thirteenth day.

During his illness there were no localized symptoms excepting those attending the fever, namely slight headache, malaise and loss of appetite. The bowels were somewhat constipated. Urine normal. There was no herpes. The Widal test for typhoid fever was made with five negative results. The blood showed nothing abnormal. The highest leucocyte count was 4,300.

In August of the same year Dr. B. was off duty for ten days with similar symptoms and no physical signs. At the same time D. B.'s junior was also affected. The two temperatures ran within one-half a degree of each other daily.

The highest in each instance was 103, and the course of each fever was eleven days.

In one of these febricular cases the attack was ushered in by a chill of moderate severity, in another there was slight irritation of the throat, but cultures showed no special organism.

All the cases recorded occurred between the months of August and December, the time of the greatest prevalence of typhoid fever.

The successive illnesses of house officers on the same service within eight months' time of pneumonia, cervical adenitis, several attacks of tonsillitis and of febriculæ, suggested as a possible cause the presence of a patent sewer trap in the room occupied by these men successively. The trap was removed, and in the two years following no more cases have occurred.

The repetition of these febricular attacks on the medical side has not been satisfactorily accounted for. Attenuated typhoid fever bacilli as the cause is excluded by the Widal reaction. An infection by a paratyphoid bacillus is a possible supposition. Tests for such organisms should be made in subsequent cases.

It has been suggested that a toxine may be the cause, or some bacterium, as the pneumococcus, in the blood.

TYPHOID FEVER.

It is worthy of note that of the two cases occurring one was in the South Department and the other on the surgical service, while on the medical service where the wards are nearly filled with such patients during the autumn months there has been no case of typhoid fever.

TONSILLITIS.

This occurred thirteen times medical, eight surgical, and three pathological. Half of the twenty-four cases occurred in January, February, and March, four cases in each of these months. Tonsillitis did not occur more frequently soon after a return from a vacation, nor near the end of a man's service. The organisms, when reported, were streptococci in all cases, usually in practically pure culture after the first or second examinations.

PHTHISIS PULMONALIS.

There is little evidence that primary infection with tubercle bacilli took place after any one of the three men had come to the hospital.

Dr. X. has a stepfather affected with phthisis. He has a history of overwork, and of being under weight before going on duty, where after two months' service in the out-patient department he had pneumonia and a few tubercle bacilli were found with the diplococci of pneumonia. Later very slight signs were found in one apex. He went to Saranac Lake for one year and has returned to his service without subsequent symptoms.

Dr. Y. has one sister affected, and one brother died of phthisis. He has a history of at least four exacerbations before entering the pathological service, where after nine months' work he had a sudden hemorrhage, and active signs were found in his left apex. He apparently recovered health, went to the Philippines with the army. An exacerbation with rapid extension of the process took place. He is now at Saranac Lake.

Dr. Z. had a chronic tubercular process. However, in spite of his known affection he was admitted to the army where he died after some years spent in its service.

LOCAL SEPTIC INFECTION.

This occurred almost exclusively on the surgical and pathological services, apparently due to the condition of the skin rather than to any other cause. Local inflammatory processes such as dermatitis or fissured hands furnished favorable points for the invasion of organisms. In one case a prick from a needle while sewing up a case of general peritonitis caused a local infection and a septic arm. Free incisions were made. Streptococci were found persisting a month later.

In another instance an infection of streptococci occurred in a dermatitis following a sunburn of the arm. The infection was of so severe a character that the house officer was off duty three months.

The use of rubber gloves, both at surgical operations and in handling septic pathological material, has been found to lessen the number of infections. This has been demonstrated most clearly in the pathological laboratory where hair-follicle infection was almost constant before the use of gloves.

There has been no evidence of an immunity from such infections occurring. With certain organisms, notably the aureus, repeated re-infections have been the rule.

FURUNCULOSIS.

Five cases surgical and one medical. The medical case was a single furuncle with no recurrence. In the four other cases recurrence was frequent for weeks, seriously interfering with work and with the general health.

SOUTH DEPARTMENT.

There have been seventy house officers in the South Department for Contagious Diseases, each serving three months in the diphtheria and three months in scarlet fever wards. A large number of substitutes have served for varying lengths of time.

The contagious cases among house officers from August 31, 1895, to July 1, 1903, were as follows:

TABLE B.

YEAR.	Diphtheria.	Scarlet Fever.	Measles.	Mumps.	Varicella.
1895 Aug. to Dec. (inclusive) . .	1	..	..	..	..
1896	2	2	..	..	..
1897	2	..	1	..	..
1898	2	1	..	1	1
1899	4	2	..	1	..
1900	4	1	..	1	..
1901	5	1	..	..	..
1902	6	2	..	..	..
1903	4	1	..	..	..

Other diseases occurring were:

Follicular Tonsillitis	5
Cervical Adenitis	1
Gastro-Enteritis	1
Facial Erysipelas	1
Septicæmia	1*
Septic Finger	2
Nervous Exhaustion	1
Influenza	1
Typhoid Fever	1*

There have been no deaths from any contagious disease during this time. One house officer died of septicæmia following a streptococcus infection after a burn. One died of typhoid fever after being transferred to the main hospital.

One house officer had measles, mumps, and varicella during his six months' service. Three had both diphtheria and scarlet fever, one had diphtheria twice, one had diphtheria and mumps.

Two house officers immunized themselves by injections every month of 1,000 units of anti-toxine, one doing this after having diphtheria during the first two months of his service. He had no re-infection. The other did not have diphtheria.

The objection to such immunization is the danger of urticaria or arthralgia following the use of anti-toxine; therefore Dr. McCollom has preferred the early use of anti-toxine on the first appearance of a sore throat.

Table B shows an increase in the number of diphtheria cases co-incident with an increase in the number of house officers appointed in 1899.

The average duration of diphtheria was fifteen days, that of scarlet fever forty-three days.

In 1894 of twelve men, serving four months each in the contagious wards on two successive services, eight had either diphtheria or scarlet fever. One of the remaining four had typhoid fever

At one time in the South Department of six men on service five were sick with either diphtheria or scarlet fever.

Five cases of diphtheria occurred in February, five in July, three each in January, August, October, and November.

* Died December 1901.

a less number in the remaining months, and none in September.

In a contagious service of six months a house officer's chance of having diphtheria is one in two, of having scarlet fever one in seven.

The following comparative table is made from the time book of the house officers for the past seven years, and includes the South Department:

TABLE C.

Average Number Times Sick per House Officer.

YEAR.	Medical.	Surgical.	Pathological.	Contagious.
1896.....	.3	.7	1.0	1.5
1897.....	.3	.7	1.5	1.2
1898.....	.7	.2	.5	1.5
1899.....	1.1	.4	1.0	1.5
1900.....	1.0	.3	1.5	1.3
1901.....	.7	.8	.5	1.2
1902.....	.5	.5	.0	1.5

Average Number Days off Duty per House Officer.

YEAR.	Medical.	Surgical.	Pathological.	Contagious.
1896.....	4.0	7.0	10.0	Average for seven years per house officer, 18.
1897.....	2.0	5.0	72.0	
1898.....	9.0	1.0	45.0	
1899.....	21.0	4.0	82.0	
1900.....	18.0	6.0	18.0	
1901.....	15.0	10.0	1.0	
1902.....	6.0	12.0	.0	

Average Number Times Sick per House Officer Yearly for Past Seven Years.

Medical.	Surgical.	Pathological.	Contagious.
.7	.5	.8	1.4

Average Number Days Off Duty per House Officer Yearly for Past Seven Years.

Medical.	Surgical.	Pathological.	Contagious.
10.7	6.0	32.0	18.0

This table, although taken from a different source, shows practically the same results as Table A.

A case of phthisis and of septic reinfection on the pathological service explains its proportionately large number of days off duty.

EXERCISE.

Much interest has been shown, both by the visiting staff and by the Hospital authorities, that the house officers, who are so much confined to the wards, and who have a large amount of night work to do (except the pathological service), should have means of obtaining proper exercise on the Hospital grounds.

However, little had been accomplished of practical value until the year 1899, when two excellent tennis courts were built, and a year later the trustees, aided by generous contributions from the visiting staff, installed two squash tennis courts and equipped them with adequate electric lighting. Shower baths were also supplied. This has offered an excellent opportunity for obtaining sufficient exercise, practically in the open air, with means for a proper bath and rub down afterwards.

The relation of systematic exercise and the condition of the men at the end of their services in the main Hospital, as stated by at least two men of each delegation for the past seven years, is shown by the following statement:

By systematic exercise is meant the obtaining of exercise at least three times a week sufficient in amount to cause free perspiration, and followed by a rub down.

Medical.

Number of men taking systematic exercise, 13. Condition at end of service: good, 12; fair, 1.

Number of men taking occasional or practically no exercise, 29. Condition at end of service: fair, 16; stale, 13.

Surgical.

Number of men taking systematic exercise, 1. Condition at end of service, good.

Number of men taking occasional or practically no exercise, 41. Condition at end of service: good, 6; fair, 12; stale, 23.

Pathological.

Number of men taking systematic exercise, 6. Condition at end of service: good, 6.

Number of men taking occasional or practically no exercise, 2. Condition at end of service, fair.

The other six men were out of doors afternoons and were in fair physical condition.

By "good" is meant general health excellent, weight normal, and fit to repeat service.

By "fair" is meant tired, but able to do his work well.

By "stale" is meant under weight, appetite poor, having nervous disturbances.

Answer to first conditions were: "Felt fine, never better in my life."

Answer to second conditions were: "Pretty tired, but did my work."

Answers to third conditions were: "I was done." "Fagged out." "Didn't get into good condition for months."

Since the establishment of proper means of exercise and baths, of eighteen men serving medical, nine have taken systematic exercise, and their condition at the end of their service was "good." Of the eighteen men preceding them only one took systematic exercise, and but four reported their condition as "good."

CONCLUSIONS.

The number of cases has been too few and the time too short to warrant any definite conclusions, especially as regard pathological house officers. The records of medical and surgical services, sixty men each, and contagious, seventy men, would indicate that the danger of house officers having pneumonia, phthisis or typhoid fever is very small, one only of these cases occurring medical and then in an individual of low resistance.

That naso-pharyngeal and febricular affections occur medical in the ratio of 2 to 1 either surgical or pathological.

That local septic infection is the most frequent disease surgical and pathological.

That the danger of infection in the examination of moist cultures and sputum is very slight, as evidenced by no infection occurring in the staining of thousands of smears for the Klebs-Loeffler and tubercle bacillus and the making of the Widal test with the pure culture of typhoid bacilli.

That there is little evidence in the ten years' records that a house officer's general condition is a marked factor in the question of infection by a contagious disease.

That, in a six months' service the chance of diphtheritic infection, including mild cases, is one in two, of scarlet fever infection one in seven.

As regards the influence of improved living quarters, and facilities for proper exercise, upon the health of house officers, Table C shows a marked decrease in the average times sick yearly, per house officer medical, where 50 per cent. of the men have taken systematic exercise, from 1.1 in 1899, the year following the increase of service to two years, to .5 in 1902, and in the days off duty for sickness from twenty-one to six. The decrease is more marked pathological. On the surgical service, where there has been practically no systematic exercise, the averages are nearly the same.

The generally improved physical condition of house officers is a matter of comment.

It should be urged upon house officers that the sense of fatigue occurs most often in the hospital as the result of

nervous tension and indoor air rather than to muscular exhaustion, and is therefore relieved by proper exercise and baths, and that the reasons offered for insufficient time to take systematic exercise, at least, three times weekly, are plausible rather than real.

V.

CYTODIAGNOSIS.

By Fritz W. Gay, M.D., former House Physician.

Ever since Widal and Ravaut (Comp't. rend. de la Soc. de Biol., July 6, 1900) reported the results of their studies of the cells contained in fluids from the pleural cavities there has been renewed interest in cytodiagnosis. If, by this means, it is possible to determine whether or not a pleuritic fluid is of tubercular origin, a very important addition has been made to modern clinical methods.

Dieulafoy (Int. Clinics, Series XII., Vol. III., 1902) having in mind the work of Widal and Ravaut, divides pleuritic fluids into three groups, according to the predominating type of cell which they contain.

The first group contains almost exclusively endothelial cells, and includes the effusion of cardiac disease, nephritis, cancer, and that due to compression.

The second variety contains polynuclear and large mononuclear elements, and includes the "acute infectious pleurisy," due to the pneumococcus, streptococcus, and staphylococcus.

The third group contains a large proportion of mononuclear leucocytes, small lymphocytes, and includes the effusions due to tuberculosis.

The picture which Dieulafoy draws for us — the removal of a syringeful of fluid with aseptic precautions, microscopic examination of the sediment, and immediate assignment to one of the above groups — is so attractive that we hope the test of time will not make it fade.

As the exact value of this method of diagnosis cannot be determined until more statistics have accumulated, the

results of the routine examination of forty pleuritic fluids made at the Boston City Hospital the past year may prove of interest. These cases are made available through the courtesy of Drs. A. L. Mason, E. M. Buckingham, G. G. Sears, J. L. Ames, and H. D. Arnold, visiting physicians to the Boston City Hospital.

METHODS.

The specimens were obtained in the usual manner, with aseptic precautions. About thirty c.c. of the fluid was centrifugalized, and a loopful of the sediment spread on a glass slide, and examined either stained or unstained. At first unstained specimens were studied, then others stained with ordinary stains. After considerable experimentation the following method was found the most satisfactory, and the forty cases recorded were all examined in this way: After centrifugalizing the fluid above was nearly all poured off, the tube refilled with tap water and again centrifugalized, the sediment transferred to a glass slide, carefully dried, and stained with the Jenner blood stain. The nuclei were more sharply distinguished from the protoplasm if the specimen was first slightly overstained and then decolorized with 70 per cent. alcohol.

On examining a stained specimen there was no difficulty in recognizing the polynuclear and large mononuclear leucocytes. The endothelial cells or flakes were easily made out when they retained most of their protoplasm; but where there was practically only a nucleus it was impossible to distinguish endothelial cell from small mononuclear leucocyte. In some specimens it was possible to say that there was really an excess of lymphocytes, but in many there were very many small mononuclear cells that might be either the nuclei of endothelial cells or lymphocytes. This difficulty is one which led to the investigations of V. Patella, who believes that nearly all of these small mononuclear cells are derived from or are the nuclei of endothelial cells (Deut. Med. Woch., April 17, 1902). In classifying the cellular content of these cases, two groups are found, the polynuclear and the mononuclear. Where an undoubted excess of endo-

thelial cells was found, or where it was certain that there were many lymphocytes, this was noted in the record. In estimating the percentage, five hundred or more cells were counted in each case.

In addition to the cellular content of these fluids, the accompanying table gives the age and sex of the patient, the side of the chest involved, the amount of the aspiration, the specific gravity, color, and reaction of the fluid, the percentage of albumen, the presence or absence of the diazo and Widal reactions in the fluid, the presence or absence of tubercle bacilli in the sputum, the white count, the result of a culture of the fluid, and the clinical diagnosis. The albumen was quantitated by the Esbach urinometer. The sputum was stained with carbol fuchsin and Gabbet's methylene blue.

It will be seen from the table that twenty-nine cases showed a majority of mononuclear cells, the remainder a majority of polynuclear cells. Of the mononuclear group, two were associated with tubercle bacilli in the sputum; one gave a positive tuberculin reaction; five showed an undoubted predominence of lymphocytes (including the case that gave a positive tuberculin reaction); six showed definite cardiac disease as a cause of the pleuritic fluid, four of these being confirmed by autopsy. In only one of these latter was it possible to say that the endothelial cells formed the majority of the mononuclear cells, and this was a case in which the fluid had accumulated very rapidly.

Of the polynuclear group, two were associated with pneumonia; five were empyemas; one had a history suggesting pneumonia three weeks before entering the hospital.

Case 11 is of unusual interest, as it showed at autopsy pneumonic consolidation of the left lower lobe with an old encysted pleurisy adjoining. This fluid showed a large percentage of mononuclear cells though in every field there were many diplococci. There were no tubercular foci in the lungs.

In the last case the diagnosis was first made when a positive Widal reaction was obtained with the pleuritic fluid. This is another instance of the value of the Widal reaction

in the routine examination of pleuritic fluids, as emphasized by Dr. Sears (Med. and Surg. Reports of B. C. H. 1902).

Mitotic figures were seen in several cases, including case numbered 19 and 20, but were not numerous enough to attract attention. This case was one of a rapidly recurring effusion, at first serous, later bloody, associated with loss of weight and severe pain in the back and shoulders. Permanent drainage was established, and a piece of pleura removed at the time of operation confirmed the diagnosis.

CONCLUSIONS.

This experience with cytodiagnosis leads us to believe that —

(1.) There are two classes of pleuritic fluids, those which have a large proportion of mononuclear cells, and those with a large proportion of polynuclear cells.

(2.) In a very small percentage of the former cases it is possible to say whether they are chiefly endothelial cells or chiefly lymphocytes.

(3.) Cytodiagnosis is of considerable value as an aid to diagnosis, and should be considered a part of the routine examination of every case of fluid from the pleural cavity.

(4.) Cytodiagnosis has not the extreme value which was first attributed to it.

Case.	Age.	Sex.	Side.	Amount.	Sp. Gravity.	Reaction.	Albumen.	Color.	Dinzo.	Widal.	Cellular Content.		Sputum.	Leucocytes.	Culture.	Clin. Diagnosis.	Remarks.
											Polynuclears.	Mononuclears.					
1.....	65 W.	Male.	Left.	2,663 c. c.	1,020	Alkaline.	½ per cent.	Yellow.	Neg.	Neg.	6 per cent.	94 per cent.	No T. B.	8,200	Sterile.	Cardiac.	
2.....	19 S.	"	"	1,000 c. c.	1,026	"	1 "	Amber.	"	"	60 "	40 "	"	19,000	Streptococci.	Pleurisy with Eff.	Empyema later.
3.....	18 S.	"	"	2,000 c. c.	1,026	"	¾ "	"	"	"	25 "	75 "	"	9,400	Sterile.	" "	
4.....	18 S.	"	"	2,500 c. c.	1,026	"	¾ "	Greenish.	"	"	10 "	90 "	"	9,000	"	" "	
5.....	28 S.	"	"	2,500 c. c.	1,020	"	1½ "	Yellow.	"	"	60 "	40 "	"	9,600	"	" "	
6.....	53 S.	"	"	3,500 c. c.	1,014	"	1 "	Reddish.	"	"	55 "	45 "	"	12,000	"	" "	
7.....	22 M.	"	Right.	120 c. c.	1,021	"	½ "	Yellow.	"	"	25 "	75 "	T. B. present.	11,200	"	Pneumohydrothorax.	
8.....	40 M.	"	Left.	2,000 c. c.	1,025	"	1 "	Amber.	"	"	70 "	30 "	No T. B.	12,200	"	Pleurisy with Eff.	
9.....	63 W.	"	"	150 c. c.	1,026	"	1½ "	Yellow.	"	"	80 "	20 "	"	16,000	"	" "	Pneumonia.
10.....	17 S.	"	"	1,000 c. c.	1,022	"	1 "	"	"	"	2 "	98 "	"	8,900	"	" "	Tuberculin test pos.
11.....	?	Female.	Both.	180 c. c.	1,017	"	½ "	"	"	"	30 "	70 "	"	.....	.....	" "	Pneumonia; autopsy.
12.....	23	Male.	Left.	1,500 c. c.	1,026	"	½ "	"	"	"	20 "	80 "	"	.....	Sterile.	" "	
13.....	31 S.	Female.	Right.	500 c. c.	1,033	Neutral.	1 "	Amber.	"	"	70 "	30 "	"	9,200	"	" "	
14.....	24 S.	Male.	Left.	1,500 c. c.	1,019	Alkaline.	1 "	Yellow.	"	"	20 "	80 "	"	6,400	"	" "	
15.....	59 W.	"	"	1,500 c. c.	1,017	"	¾ "	"	"	.... ..	5 "	95 "	"	8,200	"	" "	Signs to chest of pulmonary T. B.
16.....	34 M	Female.	"	1,500 c. c.	1,018	"	1½ "	Amber.	"	.....	16 "	84 "	T. B. present.	.....	"	" "	
17.....	41 S.	Male.	"	?	1,024	"	1 "	Yellow.	"	.....	20 "	80 "	No T. B.	.....	"	" "	
18.....	21 S.	"	"	2,000 c. c.	1,026	"	½ "	Greenish.	"	.....	6 "	94 "	"	.....	"	" "	
19.....	42 W.	Female.	"	2,500 c. c.	1,025	"	½ "	Yellow.	"	"	3 "	97 "	"	16,000	"	Carcinoma of pleura.	
20.....	42 W.	"	"	2,500 c. c.	1,030	"	¾ "	Bloody.	"	"	10 "	90 "	"	.....	"	"	
21.....	24 S.	Male.	"	60 c. c.	1,020	"	1 "	Yellow.	"	"	2 "	98 "	"	16,000	"	Pleurisy with Eff.	
22.. ..	49 M.	"	Both.	400 c. c.	1,016	"	½ "	"	"	"	8 "	92 "	"	8,000	"	Cardiac.	Autopsy.
23.....	68 W.	Female.	Left.	300 c. c.	1,018	"	¾ "	"	"	"	6 "	94 "	"	.....	"	"	Autopsy.
24.. ...	23 S.	"	Right.	300 c. c.	1,023	"	1½ "	Smoky.	"	"	12 "	88 "	"	10,200	"	Pleurisy with Eff.	
25.....	41 S.	Male.	"	350 c. c.	1,036	"	2 "	Green.	"	"	98 "	2 "	"	30,000	Pneumococci.	Pneumonia.	Empyema later.
26.....	50 W.	"	Both.	1,100 c. c.	1,016	"	½ "	Yellow.	"	"	3 "	92 "	"	....	Sterile.	Cardiac.	Autopsy.
27.. ...	16 S.	Female.	Left.	3,500 c. c.	1,030	"	2½ "	"	"	"	92 "	8 "	T. B. present.	29,000	Pneumococci.	Empyema.	Autopsy; T. B. in sediment.
28.....	34 S.	Male.	"	2,600 c. c.	1,026	"	¾ "	"	"	"	4 "	96 "	No T. B.	11,000	Sterile.	Pleurisy with Eff.	
29.....	51 M.	"	Right.	2,500 c. c.	1,017	"	½ "	"	"	"	10 "	90 "	"	.....	"	Cardiac.	Autopsy.
30.....	21 S.	"	Left	1,700 c. c.	1,023	"	½ "	"	"	"	8 "	92 "	"	.....	"	Pleurisy with Eff.	
31.....	?	"	"	3,500 c. c.	1,026	"	1¾ "	Green.	"	"	12 "	88 "	"	8,600	"	" "	
32.....	23 S.	"	"	300 c. c.	1,024	"	1½ "	Yellow.	"	"	92 "	8 "	"	19,200	"	Pneumonia.	Autopsy.
33.....	24 S.	Female.	"	1,500 c. c.	1,030	"	1 "	"	"	"	96 "	4 "	"	34,400	Streptococci.	Pyo-pneumo-thorax.	
34.....	26 S.	Male.	"	2,000 c. c.	1,027	"	½ "	High.	"	"	8 "	92 "	"	9,600	Sterile.	Pleurisy with Eff.	
35.....	5½ S.	Female.	"	60 c. c.	1,036	"	2½ "	Yellow.	.....	.....	90 "	10 "	"	32,000	Pneumococci.	Empyema.	
36.....	46 M.	"	Right.	1,200 c. c.	1,017	"	½ "	"	"	"	4 "	96 "	"	16,000	Sterile.	Cardiac.	
37.....	?	Male.	Left.	1,000 c. c.	1,027	"	1½ "	"	"	"	4 "	96 "	"	17,000	"	Pleurisy with Eff.	
38.....	28 M.	"	"	1,000 c. c.	1,026	"	¾ "	"	"	"	8 "	92 "	"	14,000	"	" "	
39.....	27 S.	"	Right.	1,950 c. c.	1,024	"	1½ "	"	"	"	3 "	97 "	"	9,600	"	" "	
40.. ...	42 M.	"	Left.	2,400 c. c.	1,028	"	¾ "	"	"	"	4 "	98 "	"	10,600	"	" "	
41.....	?	"	Right.	1,050 c. c.	1,028	"	1½ "	Bloody.	"	Pos. (1–40)	62 "	38 "	"	6,400	"	" "	Typhoid.

[1] Chiefly lymphocytes.

[2] Chiefly endothelial.

VI.

GENERAL PERITONITIS COMPLICATING SCARLET FEVER.

By John H. McCollom, M.D., and John Bapst Blake, M.D.

General peritonitis due to streptococcus infection as a complication of scarlet fever is extremely rare. That this condition may exist and not be recognized is possible, for the patient in a given case may be so delirious as to prevent a diagnosis being made, or the prostration due to the attack of scarlet fever may mask the characteristic symptoms to such an extent as to render a diagnosis impossible. When we take into account the comparative frequency of endocarditis, pericarditis, and pleuritis, it would seem to prove that this complication is possibly more frequent than is generally supposed. In a clinical experience of over 8,000 cases of scarlet fever there has been a limited number of patients whose symptoms would cause one to think of the possible occurrence of this complication, but the speedy subsidence of all symptoms and the ultimate recovery of the patients would seem to prove that peritonitis could not have existed. In two instances, however, out of the 8,000 cases, peritonitis did actually occur, as is shown by the following clinical reports. In these cases the attacks of scarlet fever were not specially severe, and there was no cause for anxiety until the occurrence of the abdominal symptoms. It was not reasonable to suppose that scarlet fever *per se* was the cause of the condition, but that it was due to streptococcus infection. The great difference in the severity of attacks of scarlet fever is due not to the poison of scarlet fever itself, but is due to streptococcus infection. This has been proved many

times by means of cultures. If streptococci are found in cultures from the nose and throat the prognosis is graver than when this organism is not found. A careful study of the literature of scarlet fever proves that general peritonitis as a complication in this disease is extremely rare.

Frankel, in American Medicine, Volume 2, No. 29, reports three cases of necrotic ulceration of esophagus and stomach following scarlet fever. General peritonitis is not mentioned.

In Gould's Year Book no cases are reported in the last four volumes.

In the Reference Handbook of Medical Science, Volume 7, page 313, this statement is made: "Peritonitis occurs most rarely, and is usually purulent."

Osler, in his Practice of Medicine, does not allude to peritonitis as a complication of scarlet fever.

Wood and Fitz, in Practice of Medicine, make a slight allusion to this condition.

In the American Text Book of Diseases of Children it is stated that general peritonitis may occur as a complication of the various exanthemata. Page 580.

In Holt's work, Diseases of Infancy and Childhood, the following passage occurs: "Of acute infectious diseases peritonitis is most frequently seen with pneumonia and scarlet fever." Page 416.

In the Cyclopædia of Diseases of Children, Keating, general peritonitis is not mentioned.

In Oppenheim's Medical Diseases of Children he says that general peritonitis may be traced to the acute infectious diseases. Page 203.

In Allbutt's System of Medicine, Volume 2, page 150, tables of complications are given not mentioning general peritonitis, but says that other complications occur in less than 1 per cent. of cases.

Bauer, in Ziemssen's Cyclopædia of Practice of Medicine, Volume 2, page 282, and Wardell, in Reynold's System of Medicine, say that scarlet fever is sometimes a cause of general peritonitis.

In Pepper's System of Medicine, Volume 2, it is mentioned that general peritonitis may follow scarlet fever.

Somerset, in the New York Medical Journal, Volume 72, page 981, in a study of 2,500 cases of scarlet fever and complications, does not allude to general peritonitis.

It will be seen that although some of the authors above quoted allude to the possible existence of general peritonitis in the course of scarlet fever, they do not report any specific cases, and perhaps do not lay sufficient stress upon the possibility of its occurrence. For this reason the two following cases are reported in detail. Both present several symptoms in common, but they differ in the course of the disease, the treatment and the result. It is possible that mild peritoneal involvement may be found on careful examination to be more common than is at present believed; but if the following cases are typical of their class, another serious element is added to the already too long list of scarlatinal complications and sequelæ.

Case No. 1. — J. E., 5 years of age, entered the South Department of the Boston City Hospital on April 10, 1900, suffering from diphtheria. Both parents were consumptive; the child had had measles in the previous summer, and had been sick with a "sore throat" for five days before entrance. Two days after entrance the skin flushed, and on the following day the diagnosis of scarlet fever was obvious. There was some nasal discharge. Twenty-three days after entrance he vomited and complained of pain in the abdomen, but nothing could be found on physical examination. The urine became slightly albuminous and the tenderness and rigidity of the abdomen continued, as did the vomiting. Ten days later the umbilicus began to protrude, the area around it being reddened, swollen and painful; the abdomen was distended and dull in the flanks. Forty-three days after entrance the child was tapped in the middle line of the abdomen, and twenty-one ounces of pus withdrawn, a culture from which showed streptococcus pyogenes; on the following day the umbilicus ruptured and fluid leaked from it for several days. On May 31 the child was aspirated in the seventh space, left posterior axillary line, and a few drachms of pus withdrawn from the thorax: on this day the right ear was noted to be discharging slightly. Two weeks later, while steadily improving, his friends insisted upon taking him home, and as he had finished desquamating he was discharged against advice, signs of fluid being still present in the chest and abdomen. Four months later he was shown at a meeting of the Boston City Hospital Clinical Club, apparently well.

Case No. 2. — W. S., 31 years of age, was admitted to the South Department April 22, 1903. His family history was good; he had had

measles, pertussis and varicella during childhood, and rheumatism later. He had been sick for six days before entrance, the onset being accompanied by sore throat and vomiting. He had a brilliant scarlet fever eruption, and also a systolic murmur at the apex, which was in the fifth space outside the nipple line. The abdomen was negative. He progressed without complications, his general condition being good, until thirteen days after entrance, when a slight trace of albumen was found in the urine, and he was slightly nauseated. On the following day there was pain in the abdomen, but no spasm or tenderness. Early on May 9, four days after the appearance of the albumen, he complained of great abdominal tenderness and passed no urine at all. Distention, rigidity and muscular spasm rapidly developed. The legs were drawn up and the face became pinched. He was seen by Dr. Abner Post at 6 P.M., who recommended laparotomy, which was performed by Dr. J. B. Blake about two hours later. Under ether the abdomen was opened in the median line below the umbilicus. There was free discharge of thin pus, followed by a curd-like substance. The intestines were red and congested. The appendix, gall bladder and other abdominal organs were negative. The peritoneal cavity was flushed with several quarts of hot saline solution and drained with seven gauze wicks. No obstruction of the intestines was found, though they were everywhere distended with gas. The patient rallied, and for a few hours seemed a trifle better. The suppression of urine continued, however, in spite of salt infusion and enemata; the vomiting increased the pulse became weaker, and he died twenty-five hours after the operation. Culture from the pus showed streptococcus. The urine, two days before operation, was smoky, contained a trace of albumen, and a sediment of normal and abnormal blood, blood casts, epithelial and refracting casts, a small amount of pus and some round cells. At the time of operation the urine contained 1 per cent. albumen.

The autopsy was performed on the following day. The undertaker had already partially embalmed the body, punctured the intestines and stomach in numerous places, and filled the abdominal cavity with an acrid fluid containing formalin. This changed the peritoneal appearances decidedly. No retroperitoneal focus of pus was found. There was an easily separated fibrin layer on the diaphragm, spleen and liver, and a similar layer found lining both pleuræ.

There were small cauliflower masses of fresh red deposit on a chronic thickening of the edge of the mitral valve curtain, with small amounts of fibrin clinging to it.

The capsules of the kidneys were under some tension and yielded a slight hernia of the substance on section. The left kidney was only one-third the size of the right. There were two complete ureters from each kidney to the bladder and four distinct openings into the bladder. This is a very unusual condition, and is, according to Gould, the eleventh case on record. (A. H. Gould, Am. Journal Med. Sciences, March, 1903.)

The anatomical diagnosis was:

Acute fibrino-purulent peritonitis (cause unknown).
Acute bilateral fibrinous pleuritis.

Acute vegitative mitral endocarditis.
Acute nephritis.
Acute splenic tumor.
Acute bronchitis.
Cœliotomy.
General arterio sclerosis.
Chronic mitral endocarditis.
Bilateral double ureter.
Chronic adhesive pleuritis.

These two cases present in common a series of complications, a late development of the peritoneal symptoms and an absence of local purulent foci. The family history of the child suggests a tubercular peritonitis, but the culture from the pus showed streptococcus. The child's temperature began to rise and fluctuate several days before abdominal symptoms were noted; part of this rise may have been due to an involvement of the middle ear, but at least a part of it was probably due to the beginning peritoneal infection, which was gradual and comparatively painless in its onset. In the other case the onset was very acute, suggesting sudden intestinal obstruction and rendering an operation imperative, in spite of the almost complete suppression of urine.

We had, therefore, in both cases, a peritonitis occurring late in the course of scarlatina, due to streptococcus, and independent of any local inciting cause; it was apparently only a part of a very widely distributed general infection involving other serous cavities, as well as excretory organs, special sense organs, and a part of the circulatory system. It seems fair to assume, therefore, that the peritoneum was infected through the blood, as was also the pleura. This is of course a difficult thing to prove. Cultures taken from the blood in the fatal case might have thrown some light upon it. There is no good reason, however, for doubting that infections of the peritoneum through the blood may occur. There is no more obvious explanation in this case and much that would be consistent with it.

TREATMENT.

If the signs of peritoneal infection are slight in degree and extent, palliative measures alone, such as enemata, turpentine

stupes, rectal feeding, will suffice. If, however, the pulse steadily rises, and pain, tenderness and spasm increase, the indication for drainage is imperative. The condition of the kidneys is the most definite contra-indication to operation, and whenever possible cocaine should be substituted for ether. The operation should consist of a rapid cœliotomy, thorough irrigation with hot salt solution, and drainage. Unless there are definite local symptoms the incision should be in the middle line. To favor drainage, hot, moist dressings, frequently changed, are desirable. Salt solution under the breasts and by rectum, and water by mouth if the patient is not vomiting, are all definitely indicated. Stimulation should be free, but alcohol may be contra-indicated by the nephritis. Caffein, strychnia and digitalis may be used energetically.

The prognosis is always grave, and a successful outcome like that in the first case may not often be anticipated.

VII.

A CASE OF CHRONIC INTERNAL HYDROCEPHALUS IN A YOUTH.

By E. E. Southard, M.D., and W. F. Roberts, M.D., Former Pathological House Officer.

[From the Pathological Laboratory of the Boston City Hospital.]

Following is a case of chronic internal hydrocephalus occurring in a youth ten years after fracture of the skull. After death were found organized basal meningitis and focal sclerosis of the right anterior choroid artery.

An Irish boy of seventeen entered the Boston City Hospital, August 30, 1902, with symptoms and signs of heightened intracranial tension.

Ten years before he had suffered a compound fracture of the skull to the left of the vertex, from which he was perfectly recovered by the end of four months. Seven and a half years before the present illness he suffered a somewhat severe contusion of the occiput from kick by horse; there was considerable swelling, apparently with infection; but he recovered in the course of time with repeated dressings, all the while an out-patient. He had recently, until within seven months, worked in a harness shop. Habits were excellent; the family history, irrelevant. Scarlet fever and malaria were the only acute diseases remembered.

During the seven months preceding his entrance he had developed a rather characteristic set of symptoms:

1. Vertigo.

2. Unconsciousness at irregular intervals in attacks lasting two minutes. There was a peculiar aura consisting of numb feelings about the eyes and in the tongue. Then followed

agitation of limbs, gradually shared by the whole body. The tongue was not bitten in the attacks.

3. Projectile vomiting, usually after breakfast, occasionally after other meals, without wretching or nausea. This had ceased three months before entrance.

4. Headache, general and nearly constant for the seven months.

5. Blindness, absolute for the last nine weeks. The "mist" had begun three months before in the left eye. When examined by one of the writers (W. F. R.) at the Massachusetts Charitable Eye and Ear Infirmary, five months before entrance at the City Hospital, there were already well marked choked discs, and the symptoms already strongly suggested brain tumor.

Physical examination showed no paralysis or sensory disturbance, except bilateral loss of smell and blindness. The tongue was protruded in the middle line. Movements of the face were symmetrical. The reflexes were scarcely affected: the left knee-jerk, absent; Babinski reflex and ankle-clonus absent. These phenomena with ataxia both standing and walking pointed to lesion in the cerebellum (Dr. W. N. Bullard).

The operation was performed by Dr. J. C. Munro six days after entrance. Upon trephining the right occipital bone, there was no pulsation in the dura, and there was considerable hernia cerebelli without evidence of new growth or other lesion. The right ventricle was tapped through a second trephine opening, and there was a profuse discharge of several ounces of clear ventricular fluid under pressure. The pulsation then returned.

After the operation the patient was so far improved that he lay quietly for some days with a little pain at the site of the incisions, but without general headache. There was a slight improvement in vision so that he could now distinguish light with the right eye. The knee-jerk came back upon the right side, but never became so marked as upon the left side. There was some ataxia in movements of the hands.

Seventeen days later his temperature rose to 105° F., and he vomited several times. He had a clonic spasm of the right arm at intervals.

The right ventricle was again tapped, and considerable fluid was withdrawn under pressure. Pulsation of the dura was brought about once more, but the boy never regained consciousness and died the next morning, with the intracranial pressure unabated.

We may here express our obligations to Dr. W. N. Bullard, Dr. J. C. Munro, and the house officers of the First Surgical Service for access to the clinical records.

CLINICAL SUMMARY.

History of head injuries with perfect recovery. Vertigo, attacks resembling Jacksonian epilepsy, projectile vomiting, headache, blindness, ataxia, loss of right knee-jerk, increase of left knee-jerk: the syndrome occupying seven months. Exploratory operation upon right posterior fossa cerebri and tapping of right ventricle. Some relief of symptoms. Tapping of ventricle a second time. Death eighteen days after initial operation. Duration of fatal illness less than eight months.

Permission was given to open the head only. The examination nineteen hours after death was made by one of us (E. E. S.) during the service of Dr. F. B. Mallory, to whom we are indebted for aid in the report. Following is a description of findings.

Well developed, well nourished white boy. Rigidity of extremities and of arrectores pilorum. Lividity slight. Pupils dilated, left somewhat less than right. Operative incisions.

Pericranium adherent over nickel-sized area in the left frontal region. Inner table shows no sign of lesion at this point. Cranium of the usual thickness. No sign of fracture at the base.

Dura and cranium interadhere in parietal regions. There is firm interadhesion of tissues, both within and without the cerebellar window. Sinuses filled with fluid blood.

Pia lifted from sulci in the vertex region by a clear fluid containing a few fibrinous flocculi. Pacchionian granulations extensively developed, as in old age. The pia at the base is quite regularly overgrown, especially about the olfactory nerves, and the optic chiasm, and around the vessels of the circle of Willis, which are normal. The overgrowth looks thicker than it actually is from the extreme œdema. The overgrowth is of closest texture in the fossæ between medulla and cerebellum. The areolar tissue of the Sylvian fossæ is normal except for œdema. The pia is everywher eœdematous but nowhere evidently thickened. The pial veins of the left side are more markedly injected than those of the right. The pia beneath right hemisphere of cerebellum is puffed out with perhaps fifty cubic centimeters of clear fluid. No evidence of tuberculosis.

Convolutions show marked flattening; both hemispheres are still under a degree of tension. Substance everywhere apparently normal except where changes have followed the operations: there is very little injection in the track of the paracentesis; the right cerebellum is well dismantled, presenting a gray-red, thready, grumous mass, in which there are no naked eye evidences of neoplasm, or of other lesion not caused by operation.

The ventricles contain ten or fifteen cubic centimeters of fluid, on the left side clear, on the right clear and red from the laking of blood. Vessels in ventricle floor equally injected on the two sides. Choroid plexuses on both sides exhibit several opaque yellowish masses, one to two millimeters in diameter. The upper surface of the right choroid plexus is overgrown with connective tissue, so that the fornix cannot be stripped forward without ripping out bits of brain substance. The right anterior choroid artery shows a well marked yellowish patch of arteriosclerosis, three millimeters in diameter, four centimeters from the origin of the artery, two-thirds occlusive.

ANATOMICAL SUMMARY.

Chronic leptomeningitis with organization, especially well-marked at the base, about the superficial origins of Nerves I.

and II., and between medulla and hemispheres of cerebellum. Focal sclerosis of right anterior choroid artery. Chronic inflammatory changes with organization in right choroid plexus. Psammomata of both choroid plexuses. Epicerebral œdema. Internal hydrocephalus.

The foregoing is a bit of evidence in the case against idiopathic internal hydrocephalus.

It is possible to hold that internal hydrocephalus is, like external hydrocephalus, never a genuine entity.[1] Acute internal hydrocephalus[2] usually proves to be one aspect in the picture of a meningitis, of cerebral œdema from fracture of the skull, of commotio cerebri, of alcoholism, of renal or cardiorenal disease. Those cases of internal hydrocephalus, classed acute, that have been likened to angioneurotic œdema of the subcutaneous tissues,[3] and the cases of so-called serous apoplexy[4] have the best title to the term entity. These cases are probably best reckoned as chronic with exacerbations,[5, 6] or confessed as obscure.

It is less easy to dispose of chronic internal hydrocephalus as in all cases a partial phenomenon. Chronic internal hydrocephalus is systematically divided into the congenital and the acquired.[7] It would probably be better to distinguish the form running its course before union of sutures from a form, less well defined, occurring after sutural union.

The factors in the form of chronic internal hydrocephalus before union of sutures are uncertain, may involve a basal meningitis,[8] a dysostose cleidocrânienne,[9] or both, with an active secretion of lymph through the ependyma. A developmental factor is admitted or quite narrowly excluded.

The form of chronic internal hydrocephalus occurring after closure of sutures is usually regarded as arising in an exudative process, as the effect of stasis, as angioneurotic, or as forming *e vacuo*.[10] Of these, the cases *e vacuo* (in general paresis, softenings, and old age) may be set aside (in the group with external hydrocephalus which they often accompany) as without doubt partial phenomena. The part assigned to an angioneurosis must be looked on as a more or less clever hypothesis, which so far explains nothing.

As possible entities there remain, among cases of chronic internal hydrocephalus setting in after closure of sutures, two accepted (or classified) forms: A form due to exudative processes, and a transudative form with venous stasis. There is doubt whether venous stasis alone will occasion internal hydrocephalus. As to the inflammatory form, more and more cases are reported yearly which are putting the condition upon a satisfactory structural basis.[11]

Since the seventeen cases collected by Schulze,[12] the following cases of chronic internal hydrocephalus in adults, of interest on this point, have been reported:

1. Case of F. Taylor, 1897. Boy of 16, with history of convulsions, bronchitis, and scarlet fever as a child. Symptoms referable to hpdrocephalus extending two or possibly eighteen months, before death. Little characteristic in history beyond headache, vomiting, and tâche cérébrale. Autopsy: dilatation of all ventricles.[13]

2. Case of A. Heidenhain, 1899. Male of 23. Past history irrelevant. After exposure, headache, followed in three days by arching of neck with head down and shoulders forward, lax extremities, heavy gait, and slowness of speech. Later, in a course of several weeks, attacks of mania, with lowered temperature and pulse, lasting an hour. Autopsy: not remarkable, excepting in a hydrocephalus involving all the ventricles without other lesion.[14]

3. Case of Burr and McCarthy, 1900. Male of 33. Fever, bradycardia, neck-stiffness, headache, stupor, hallucinations. Improvement after three weeks with preservation of psychical changes. Recurrence of fever and meningitic symptoms after one month. Death in a second recurrence. Papillæ normal. Knee-reflexes, at first absent, recurred just before death. Almost complete deafness. Autopsy: hydrocephalus, ependymal proliferation, proliferation of subependymal glia, perivascular infiltration beneath ependyma, old and fresh inflammation in choroid plexus. Similar changes without hydrocephalus were caused experimentally in cats by the injection into ventricles of various substances.[15]

4. Case of Spiller, 1902. Male of 14⅝ years. Loss of power to walk with asymmetrical contractures and ultimate confinement to bed four years. Dilatation of right lateral ventricle from partial closure of foramen of Monro (inflammatory possibly tuberculous.)[16]

5. Case of Spiller, 1902. Male of 19. Headache with vomiting once or twice a week since childhood, six months exophthalmos. Optic neuritis. Knee-reflexes increased. Death sudden. Autopsy: cerebral ventricles dilated, fourth ventricle normal.[17]

6. Case of Grober, 1903. Woman of 24. History of malaise. No fever, slowing of pulse, or symptoms of previous meningitis. Case reported on account of focal asymmetrical symptoms, spasm in right facial region, hypæsthesia in right supraorbital region, left facial paresis, left hypoglossus paresis, increase of right knee-reflex. Grober calls the anatomical finding *Hydrocephalus* ACUTUS *internus*.[18]

7. Case of Gerhardt, 1903 Male of 22. Nine months before death, occipital pain, vomiting, vertigo, photophobia, with recovery after eight days. Seven months before death, recurrence. A second recurrence was apparently benefited by mercurial inunction (disappearance of choked disc). A third recurrence was characterized by apoplectiform attacks, with transient hemiplegia, once with double vision, without lasting focal symptoms. Autopsy: hydrocephalus, ependymitis of fourth ventricle, obliteration of foramen of Majendie, fibrous thickening and cyst-formation of choroid plexus of fourth ventricle.[19]

Such are cases in adults which form the bulk of evidence that chronic internal hydrocephalus is an entity. The condition is scarcely entitled to the name from mere obscurity of origin. The usual finding is chronic inflammation of plexuses, about foramina, or in meninges. There is a priori doubt whether chronic inflammatory changes will alone occasion hydrocephalus.[20] If they, however, will, then the supporter of hydrocephalus as entity must seek to establish chronic inflammation as entity. The work of Joslin in tracing the remote effects of epidemic cerebrospinal meningitis in producing internal hydrocephalus is perhaps the best example of work on the line of resolving these phenomena.[21]

A possible interpretation of the present case is to suppose lowered pressure in the choroid area, consequent upon focal sclerosis in the anterior choroid artery, with effusion of fluid as in infarction. That such sclerosis, not infrequent in old age, should not more often bring about internal hydrocephalus is due to the absence of chronic changes at the lymph-outlet (foramen of Majendie or proximally).

A somewhat resembling case is the often quoted case of Newman, 1882, of thrombosis of the vena magna Galeni.[22] Trendelenburg mentions, as a pathological curiosity, a case of tuberculosis effecting pressure on the vein of Galen, venous congestion, and ventricular effusion.[23] There is little doubt that tumor masses or cicatrices of various origin could be appropriately set to bring about ventricular effusion and to prevent its escape.

Further cases may throw light on the part possibly played by vascular lesions of the anterior choroid arteries in setting up internal hydrocephalus.

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VIII.

PAPILLARY ADENOCYSTOMA OF THE THYROID AND ACCESSORY THYROID GLANDS.

By Harry C. Low, M.D.

[From the Pathological Laboratory of the Boston City Hospital.]

The papillary tumors of the neck are of great importance to the surgeon, on account of their tendency to rapid local recurrence. Their histological development and their point

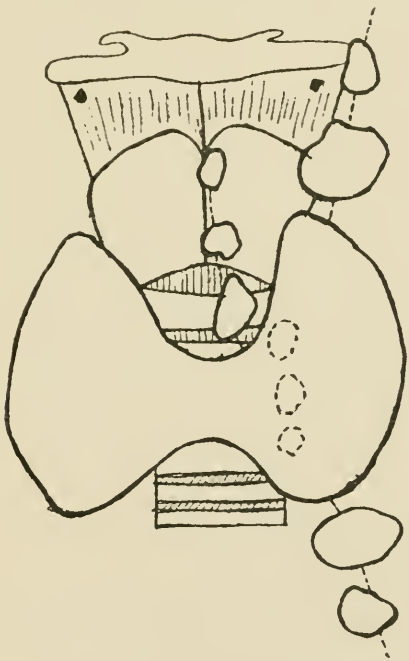

Fig. 1. Showing larynx, trachea and thyroid gland, and the most common position in which the accessory thyroids (of the left side only) are found.

of origin have been the source of much discussion. The six cases reported here are interesting in showing a true papillary adenocystomatous growth originating in thyroid tissue

from three different sources, namely, the thyroid gland itself, lobules of thyroid tissue directly connected with the gland, and accessory thyroids entirely separate from the thyroid itself.

The name accessory thyroid is used to designate those small isolated masses of true thyroid tissue, which often occur in the neck near the thyroid gland. They are apparently similar to the accessory spleens found in the neighborhood of that organ.

These bits of thyroid tissue are liable to occur as the diagram shows, either running up from the isthmus, representing persistent bits of the pyramid of Lalouette, or as the remains of extensions from the inferior or superior horns, or just posterior to the lateral lobes, lying alongside the pharynx and œsophagus. Occasionally they may occur at the root of the tongue, within the larynx, or even further from the main gland. The accessory thyroids are histologically like the thyroid gland, and are not to be confused with the parathyroids, which are of very different structure.

We must also distinguish the true congenital accessory thyroids from lobules of thyroid tissue, which may be the seat of encapsulated tumors analogous to the pedunculated tumor of the ovary. Berry thinks that most of the so-called tumors of an accessory thyroid have, in reality, developed in the thyroid gland itself, and are connected with the main organ by a more or less well defined pedicle. The accessory thyroids have been recognized as possible points of origin for all the different varieties of tumors, which may affect the thyroid gland itself, at least since Schlüter, in 1857, wrote de struma cystica accessoria. Virchow, Schnitzler, Braun, Hinterstoisser and Madelung have also reported cases of tumors of the accessory thyroids.

The thyroid tissue may be the seat of neoplasms, which differ widely in histological structure. Hinterstoisser recognized seventeen kinds of malignant goitre in fifty cases. We must distinguish those cystic goitres, resulting from softening or hemorrhage in a simple adenoma, followed by secondary papillary ingrowths from the cyst wall, which

only occupy a small part of the cyst cavity, from the true papillary adenocystoma of the thyroid.

Although this first case has been reported before,[1] it is included here because it is such an excellent example of this latter type of tumor.

Case I. — S. 01.340., female, 49 years old. Admitted to hospital May 28, 1901. Patient had much trouble from sore throat about twenty-five years ago, and since then her neck has remained swollen. Year after year the tumor gradually grew in size, but more rapidly in the last two years. During the last seven years she has had more or less discomfort at night, with stiffness of neck, and has had some palpitation, no headache or dizziness, no loss of weight, no difficulty in breathing or swallowing.

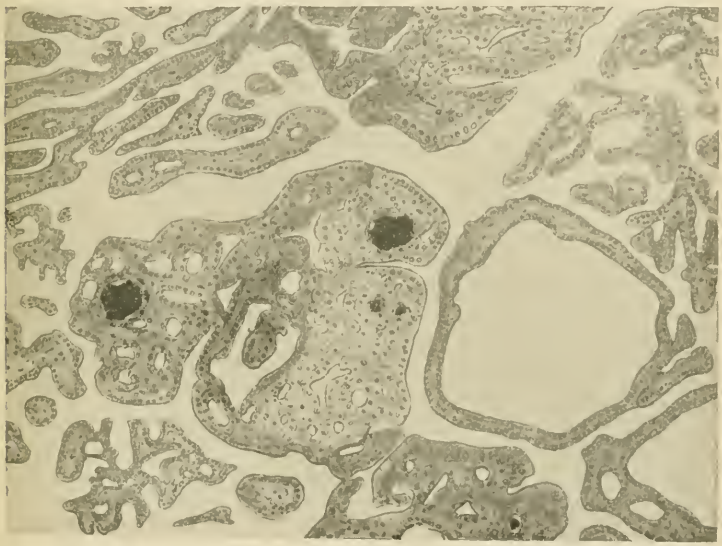

Fig. 2. Typical papillary growth of Case 1. Cells mostly like those of normal thyroid. Occasional colloid vesicle. Centre and upper right hand part is more rich in large rapidly growing cells.

Operation by Dr. F. B. Lund. — After peeling back the skin and platysma, and ligating the superior and inferior thyroid arteries on the right, the capsule of the cyst, which was covered with numerous large veins, was incised and the tumor quickly and easily enucleated. The patient made a rapid recovery.

Pathological Report. — The specimen consists of a tumor mass weighing 680 grams after it had been cut in halves, and about 10 c.c. of fluid escaped. It measured 11×12×9 cm. It is covered with a firm, thin fibrous capsule. There is no apparent point of attachment. On

[1] Low. — Papillary Adenocystoma of the Thyroid Gland. Boston City Hospital Reports, 1901.

section a moderate amount of thin, colorless fluid escapes. There are a great many cystic spaces separated by white fibrous walls. These spaces in many places contain clear fluid. The cut surface is divided by broader fibrous bands into rounded areas, which are subdivided by thin fibrous walls. A greater part of these small alveoli are filled with soft yellowish material which stands above the surface like small plugs. In the centre the cysts are large and filled with fluid.

Microsopical Examination. — The capsule is formed of dense fibrous tissue. The growth consists entirely of large and small cystic spaces filled with papillary ingrowths, and occasional small areas of simple adenomatous structure.

These cystic spaces are only separated from one another by a very thin wall, and probably intercommunicate to form larger irregularly lobulated spaces, much more than is evident in the cross section. Most

FIG. 3 Characteristic proliferating growth in Case 1. Little stroma, rich in protoplasm, large vesicular nuclei. Normal thyroid cells shown surrounding colloid masses.

of these spaces and follicles are empty, having been filled with clear fluid. Very rarely there is seen a follicle lined with flat, poorly developed epithelium, and containing eosin-staining homogeneous material, which is colloid.

The cystic spaces, the papillary ingrowths and the simple follicles, are all lined with a single layer of epithelium. This is in most places normal, healthy looking thyroid epithelium of the cuboidal type. There are however, numerous places throughout the growth, where the lining of the papillæ suddenly changes in type, and next to the cuboidal epithelium we will see a profuse growth of cylindrical epithelial cells. Instead of the smaller cell, with its round nucleus, we find a cell three times the size, rich in protoplasm, and containing a single large oval

vesicular nucleus, in which there are numerous chromatin granules. There are some small follicles, showing this same type of epithelium, and between them occasionally there is a small solid group of large epithelial cells. Mitotic figures are not numerous in these cells. The illustrations of this tumor show well both these types of growth.

There is very little stroma throughout the growth, and it shows only in places slight hyaline and myxomatous degenerations, though it is often considerably distended with fluid to form œdematous tissue in large sections of the tumor. The blood vessels are fairly numerous, and their walls show very little change.

The second case is similar to the first, but not nearly as extensive.

Case II. S. 02.309. — Female, 40 years old. In the hospital in May, 1902. Eighteen years ago noticed slight swelling in her neck, which has increased very slowly, but has caused no especial inconvenience until the last six weeks. At this time she had a sudden attack of suffocation. For an hour she had great difficulty in breathing. No trouble since. No exophthalmos nor tachycardia.

Small hard nodules can be felt in the region of the isthmus, and in the right lobe are other hard nodules. Both lobes seem to be enlarged to twice their normal size. Operation by Dr. J. C. Munro. Ether at first produced marked strangulation, so chloroform was used, with the patient in erect posture. Upper and outer portion of right lobe was partly freed, and the apex left behind. Isthmus firmly attached to trachea, which was found to be pinched to a narrow triangle by the gland, and after freeing it, respiration improved much. Upper portion of left lobe was not removed.

The specimen removed consisted of three portions of grayish-red tissue of rather soft gelatinous consistency, measuring respectively (1) $7 \times 5 \times 4$ cm., (2) $5 \times 4 \times 2$ cm., (3) $6 \times 3 \times 2$ cm. On section grayish nodules are revealed, averaging from 1 to 3 cm. in diameter and being somewhat more firm than the rest of the tissue.

Microscopic Examination. — There are various nodules separated from one another, and the surrounding glandular tissue, by broad connective tissue septa. The acini of the gland are apparently normal, moderately dilated and filled with colloid. Most of the nodules consist of an adenomatous growth. The follicles vary in size, some being filled with colloid, many having little or no central spaces, and being lined with rich epithelial cells, having large oval vesicular nuclei. There are in places small collections of these cells forming an apparently true adenocarcinomatous growth.

One of the larger nodules separated from the rest by a wall of fibrous tissue, is almost completely filled with closely packed papillary ingrowths and a few single follicles. These papillæ branch very complexly, and are covered by a single layer of high epithelial cells. There is an occasional follicle containing colloid. The stroma of the capsule and papillary masses is infiltrated with plasma and round cells. This part of the tumor shows a similar and nearly as complex papillary growth as was seen in the first case.

In the third and fourth cases the tumors probably developed either from a lobule of thyroid tissue, or having developed in the gland itself have become pedunculated as they increased in size and pushed out from the gland. At least in these two cases the growths were in direct connection with the main organs.

Case III. S. 02.359. — Male, 46 years old. Tumor has been growing gradually for nine months. It has caused no subjective symptoms. On the right side of the neck, just opposite the cricoid cartilage, between the anterior edge of the sterno-mastoid muscle, and the median line is a swelling one inch in diameter. It moves distinctly with deglutition.

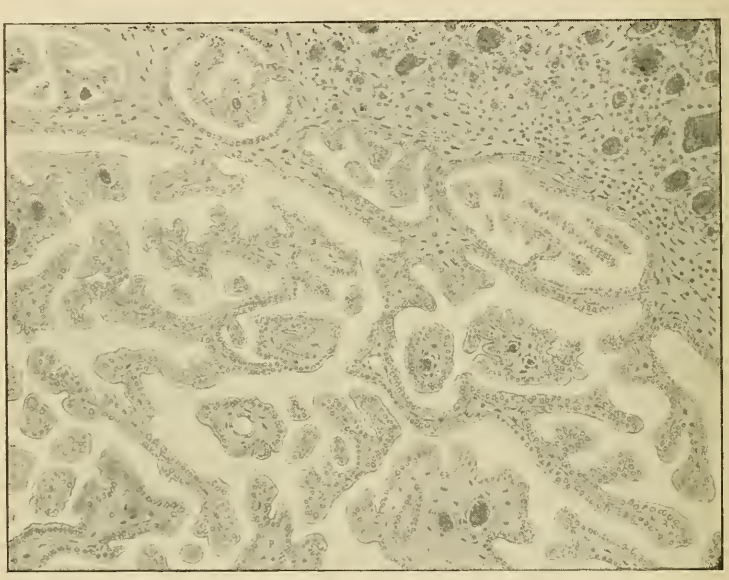

Fig. 4, Case 3. Showing part of large cystic space filled with papillary growth and scattered colloid follicles; and the bordering tissue invaded by smaller spaces and considerable connective tissue.

Operation by Dr. H. W. Cushing. A dense firm tumor very adherent to the thyroid gland was exposed. With considerable difficulty it was separated from the gland. The specimen consisted of a mass measuring $3.5 \times 3.5 \times 2$ cm. It is firm, nodular and deep red on the surface. On cross section it is yellowish gray, soft, granular, and pulpy. There are many fibrous bands throughout the growth.

Microscopical Examination.— The growth consists of many large and small cyst spaces, separated by broad bands of connective tissue. These spaces are filled with very numerous, irregular papillary ingrowths, and occasional scattered follicles containing colloid. The epithelial cells of the growth form a single layer covering the papillæ and lining the cyst spaces and follicles, but they are mostly two to

four times as high as the normal thyroid epithelium, are richer in protoplasm and have large oval nuclei. Some places, however, are covered with low cuboidal epithelial cells. At one border the growth seems to be invading the thyroid tissue, which a short distance away appears normal. There are many small alveoli filled with the papillary tumor growth pushing out into the surrounding tissue. These alveoli have a considerable connective tissue wall, from which there are bands radiating into the adjacent thyroid tissue. There is some infiltration of round and plasma cells into this stroma, and in places it shows extensive hyaline degeneration. Throughout the growth there are all kinds of epithelial cells forming a gradual transition between the lowest cuboidal and high columnar cell.

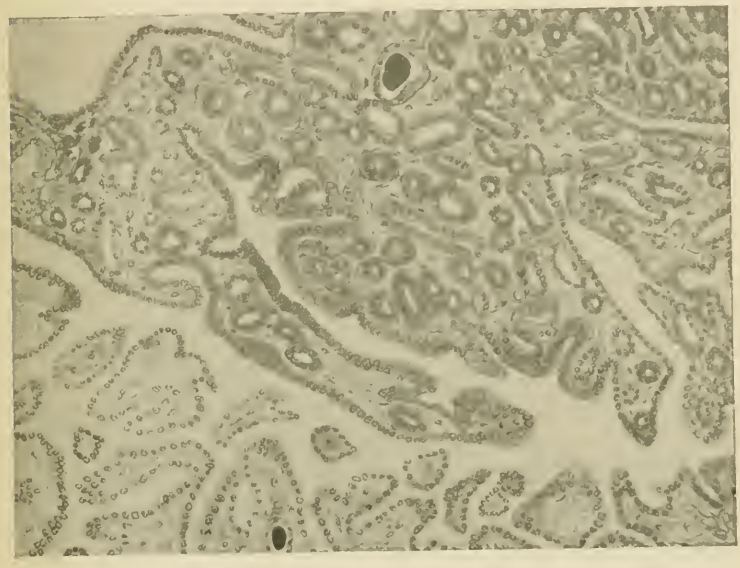

FIG. 5, CASE 4. Simple adenomatous growth resembling foetal adenoma, with great number of small vesicles and little colloid. Lower part shows character of the papillary growth which fills the whole main part of tumor.

The character of the extensive papillary growth in this case is shown in the illustration, which also well represents the structure of the small papillary development in the previous case. The facts that the growth in this third case began as a small nodule at one side of the thyroid gland, and that at operation it was found to be very adherent to the thyroid make it possible that it may have developed from an accessory thyroid, and later through some chronic inflammatory process, have become adherent to the main organ, or that it originated in a bit of thyroid tissue that formed a small lobulation of the thyroid. The latter hypothesis seems the most probable.

CASE IV. S. 02.246. — Female, 30 years old. Admitted to the Hospital in April, 1902. For several years a tumor has been slowly growing in front of the neck, just to the outer side of the right lobe of the thyroid gland. It is freely movable, and about one inch long, and

one-half an inch wide. Operation by Dr. J. C. Munro. Tumor enucleated except for a narrow pedicle at the inner portion, which was ligated with catgut. A cyst, about one inch in diameter, developed at the inner lower angle of the right lobe of the thyroid close to the isthmus.

The specimen removed was a mass of soft red tissue, the size and shape of a pecan nut. Surface dark red, dotted with small black areas, size of a millet-seed. Cut section is pale gray, soft and moist. Bands of fibrous tissue run in various directions, but otherwise the cut surface is for the most part homogeneous. There are several areas of soft granular, yellowish-white material.

Microscopic Examination. — There is a definite connective tissue capsule surrounding the growth. Inside, the structure is in good part adenomatous, with a small amount of stroma, in which are numerous small blood vessels. The adenomatous structure shows various types. A few moderately large vesicles containing colloid, many smaller vesicles with small lumen and no colloid. Between these are all gradations. These vesicles are all lined with a single layer of columnar epithelium, which is slightly higher than the ordinary epithelium of the thyroid. Throughout this adenomatous portion there are long slits or spaces, with a similar epithelial lining, which divide the tissue up into irregular lobules. Nearer the centre these spaces become larger and more irregular, the simple adenomatous structure becomes less evident, and in a major part of the tumor we find an extensive papillary development. The cells covering these papillary masses are very similar to those of the rest of the growth, being only a little larger. They do not show as many variations as were present in the first case reported. There is more stroma in the papillary portion. It contains numerous vessels distended with blood, and is in places œdematous. Into some of the spaces extensive hemorrhage has taken place. The cyst removed from the right lobe of the thyroid shows several spaces lined with cuboidal epithelium. This was in no way connected with the rest of the tumor.

This tumor being freely movable and to one side of the thyroid, though found at operation to be connected by a narrow pedicle to the main organ, has probably developed from a lobule of the thyroid gland.

The other two cases are tumors entirely separate from the thyroid gland, in both of which colloid is present, and both of which show a papillary growth, almost exactly like that of the first case.

Case V. S. 02.680. — Female, 18 years old. First noticed a small lump on the right side of her neck two years ago. This increased in size and became tender and painful. About a year ago it was operated on. Shortly after the wound closed the tumor began to grow again. At present it is tender and painful. On the neck, just behind and below the right ear, is a tumor about the size of an English walnut, which is firm but slightly fluctuant. It is not adherent to the skin, though firmly connected with the deeper structures. Operation by Dr. Paul Thorndike. As the tumor was thought to contain fluid a small incision

was made over the mass. On deeper incision considerable hemorrhage occurred. The swelling was found to be a very vascular new growth, with no evidence of suppuration. A very vascular tumor with a definite capsule was then readily freed from the surrounding tissues.

The pathological examination states that it was a firm, oval tumor, measuring 5 × 3.5 × 2.5 cm. There was a distinct capsule closely associated with muscle at one side. On section, it was gray with a few small yellowish areas and one large red area. It was granular and pulpy.

The patient returned to the hospital two weeks later on account of pain in the swelling in her neck. The record says that there was considerable fulness in the right side of her neck, extending from almost the median line to back of the sterno-mastoid muscle. On palpation a smooth elastic mass was felt, made of several nodules. It did not seem to be in any way connected with the thyroid, trachea, or skin. Thyroid

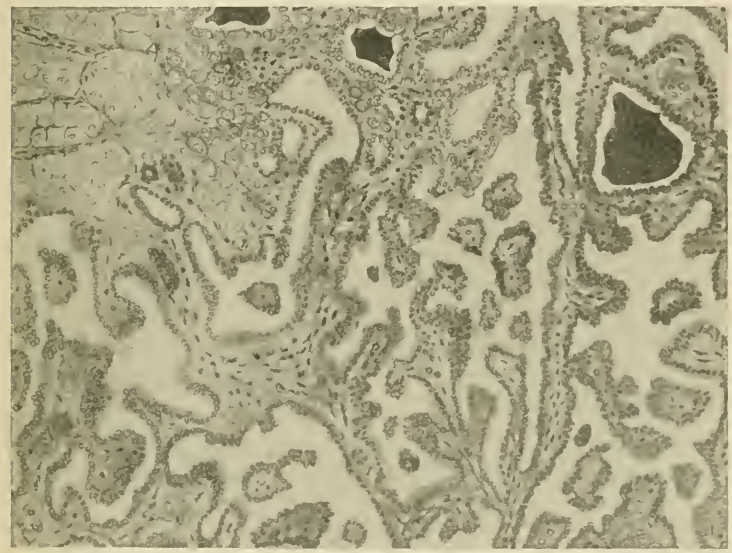

FIG. 6, CASE 5. Rich papillary growth in numerous small spaces. Cells rapidly multiplying. Many colloid vesicles. Upper left corner shows one of the many small areas simulating carcinoma.

gland apparently not enlarged. Several enlarged glands were felt in the left neck. A further operation, attended by considerable hemorrhage, resulted in the removal of two very vascular encapsulated tumors. They each measured 4 × 3.5 × 2 cm., and were similar in structure to the one previously removed. The operation was stopped on account of hemorrhage, and the new growth was not completely removed.

Microscopical Examination. — The tumor consists of small irregular spaces lined with a single layer of columnar epithelium. Owing to the fact that these spaces are encroached upon by very numerous and intricately branched papillary ingrowths from the walls they vary infinitely in size and shape. The spaces are either empty or partly filled with

mucoid material, and many of the smaller ones contain colloid. In very many places there is considerable proliferation of the epithelial cells between the spaces. These cells are quite large and have large vesicular neuclei, which occasionally show evidences of mitosis. In some places the lumina of the vesicles have become small and are filled with proliferating epithelium, and the growth resembles a true carcinoma with very little stroma. The tumor is rich in blood vessels, and shows no evidences of degeneration. Some of the papillary growths in the larger cyst spaces are distended with œdema. Although none of the nodules removed in this case showed lymphoid tissue, it seems probable that at least some of the growth developed by extension to the adjacent lymph nodes, as is evident in the following case. It is rather hard to believe that there were several separate accessory thyroids as points of origin.

Case VI. S. 99.470.—Male, 59 years old. Admitted to hospital in August, 1899, in the service of Dr. Paul Thorndike. Two years before the patient noticed a small swelling in the right neck, which has rapidly increased in the last ten months. Larynx and trachea are pushed about half an inch to the left side. Entire right side of neck is now occupied by four definite and distinct tumor masses. The most prominent is an irregular ovoid mass below the angle of the jaw. Next largest is below and towards the median line and less movable. Two other smaller ones are just above the anterior third of the clavicle. In the left neck is an indefinite tumor the size of a cherry. The skin is not adherent to these growths. The general enlargement of the axillary, epitrochlear and inguinal lymph nodes justified the clinical diagnosis of Hodgkins Disease or malignant lymphoma.

At operation an ovoid nodular mass of fairly firm consistency, measuring $9 \times 5 \times 3$ cm. was removed. There are certain nodules that are firmer than the rest of the mass. The cut surface is dark red, somewhat soft and granular.

The patient failed rapidly during the operation, which was stopped, and he died in a very short time. At post mortem examination the right side of the larynx showed a shallow depression from pressure of the growth. On the right side of the trachea and closely adherent to it is an enlarged gland extending from the cricoid six centimeters downwards. The trachea is not distorted. Below this and anterior to the trachea, not closely adherent to it, and not invading the surrounding tissues, are two other glands, one measuring $3 \times 2.5 \times 2$ cm. and the other slightly smaller. They are symmetrically enlarged, firm and nonfluctuating. On section the surface is pinkish gray, granular, and very friable, and the pulp is easily scraped off with a knife. There were two more glands about the size of the others beneath the sutured wound. One is resistant and the other hemorrhagic and pulpy. The examination of the viscera showed nothing of unusual interest. The inguinal lymph nodes were the seat of an acute inflammatory process.

The microscopical examination of the new growth, removed at operation, and at autopsy shows that it is made up of very large cystic spaces surrounded by thick vascular connective tissue bands, in which there is considerable infiltration of lymphoid and plasma cells. These spaces are completely filled with a very intricately developed papillary

growth. There is moderate amount of stroma covered with a single layer of high columnar cells. Occasionally there is seen in a section a few small round spaces surrounded by a thin layer of protoplasm with one or two nuclei. These spaces contain a homogeneous eosin-staining material. In one section was seen a group of eight or ten of these spaces lined with a definite cuboidal epithelium, and apparently filled with colloid. In the surrounding connective tissue capsule there are small spaces with papillary ingrowths, and other alveoli filled with large epithelial cells.

Some of the lymph nodes removed at the autopsy are invaded by a new growth of similar nature, consisting of cysts filled with a delicate branching papillary growth. The cysts and papillæ are lined with cylindrical epithelial cells, which have large oval nuclei and finely reticulated protoplasm. This growth is almost exactly like that in the third case.

There can be no doubt that these six tumors have developed either from the thyroid gland, or from bits of thyroid tissue. In every one of them true thyroid vesicles containing colloid were present. The only other tissues in the neck from which such a histological structure could be expected to develop are the remains of branchial ducts, and in that case the epithelium would probably be ciliated and would not show the character of the thyroid epithelium.

Gutmann, Koch, Volkmann, Bruns, Berger, and others have reported cases that were supposed to be developed from branchial ducts, and some of them showed tendency to papillary formation. Berger and Bruns think that most of them are developed from thyroid tissue, and Gutmann in writing on the development of the so-called carcinoma of the branchial duct says it develops from the accessory thyroids, and calls it a Struma carcinomatosa accessoria.

It hardly seems possible that this type of growth could develop from the salivary glands. Nasse collects fifty-eight tumors of the parotid gland, mostly endothelioma, angiosarcoma, alveolar sarcoma, and mixed tumors. Four were adenoma, but the cells were typical of the parotid and portions of the salivary gland were seen within the capsule of the tumor.

I have found reported in literature only nine other cases which seem to show a true papillary adenocystoma of the thyroid or accessory thyroid glands. Wölfler, in 1883, first carefully described this type of tumor. The first case that he reported was operated on by Billroth, in 1873, by Wölfler,

in 1878, 1881, and 1900, and two years ago Smoler wrote the clinical history of the case during the preceding twenty-seven years. When first extirpated it was a cyst, one-third of which was filled with papillary ingrowths. It is possible that previous aspirations and hemorrhage had destroyed a much more extensive papillary growth which may have been originally present. In the recurrence there was great papillary proliferation. It showed all the three types that he thinks are present in these tumors, namely, normal thyroid tissue, papillary cystadenoma and malignant adenoma, *i.e.*, adenocarcinoma. The chief part was papillary; the epithelial proliferation was in the stroma.

Wölfler also reports a second case showing only slight papillary formation in the central part. The periphery was made up of solid cell masses and long cell strands. There was no recurrence in this case, as it was probably wholly removed.

Zahn reports two cases; one, in a dog, is uncertain, as the thyroid of the dog normally shows much papillary structure. The other, in a man, 55 years old, was of four years' duration. He describes it with three other cases as developing from a branchial duct, but it undoubtedly originated from a bit of thyroid tissue. Plauth and Smoler both agree with this idea. Both lobes of the thyroid were very much enlarged, causing considerable dyspnœa. The structure was a true papillary adenocystoma.

Jores reports a small tumor of four years' growth in a man 28 years old. It consisted in the periphery of very cellular spaces, filled with cylindrical epithelium, separated by a hyaline degenerated stroma. In the centre were rich papillary vegetations covered with cylindrical epithelial cells. There were some vesicles containing colloid.

Plauth reports a case in a man 72 years old. The tumor was extirpated in 1894 and recurred within two months. It was first thought to be benign, but further examination decided it to be a sarcoma, or at least a malignant growth. In January, July, and December of 1895 there were recurrences and operations. There was found to be a cyst which refilled with blood, and probably its wall was not wholly removed. At the first operation the whole tumor

was surrounded by capsule of connective tissue infiltrated with round cells. Cross section showed papillary ingrowths into the large cyst, and in the wall numerous small cysts filled with papillary vegetations. So he considers it a multilocular cyst, the large cyst being formed by the confluence of the smaller ones and distended by hemorrhage. He thinks this tumor has developed from thyroid tissue, and Smoler also includes it in that class, though he says one cannot state positively that its starting point was not in a branchial duct.

Kapsammer reports a case of true papillary adenocystoma, probably originating from an accessory thyroid. His illustrations show a growth almost exactly like that in the third case reported in this article. It occurred in a man 58 years old, was of six years' duration, and as large as three men's fists.

Ehrhardt reports two cases of tumors of the thyroid which he calls cystocarcinoma papilliferum and papillenbildender cylinderzellencarcinom. Both were malignant adenomata showing some papillary structure. One of these cases recurred and had invasion of the lymph nodes.

Gunzler reported recently a case of papillary cystadenoma of the thyroid with metastases in the glands. I have not been able to procure his original article.

Several cases have been reported that must be considered doubtful. Pollard thinks that in his case the papillary ingrowths developed secondarily in a cystic cavity. The cyst was the size of an orange, and the several villous growths only projected in from its lower part. There was, however, another nodule consisting of smaller spaces, filled with a branching stroma, covered with a single layer of epithelium, and there were occasional vesicles containing colloid. Very likely this is a true papillary adenocystoma, and in the larger cyst the papillary growth has been destroyed by previous aspiration and hemorrhage, as may have been true in Wölfer's case. Other cases have been observed and only partially described by Hinterstoisser, Carranza, Cornil, Sulzer, Barker, Berry and Jackson Clarke. These cannot be safely included in this group.

The question of how in the thyroid, an organ in which during development and post-fœtal life there is no cylinder epithelium, a cylinder cell adenocarcinoma develops, is only explained by the supposition that there is a metaplasia of the cuboidal into cylinder cells. The different kinds of cells shown by these tumors represent all gradations between these two types.

After studying these tissues microscopically it seems most probable that Wölfer is right in his hypothesis that the proliferation of the epithelium takes place first, and the stroma follows it into the papillæ. Ehrhardt says he is unable to confirm this view, and that we must conceive the origin of the papillæ as the preformance of the stroma. In most of these cases, however, the proliferation of the epithelium is the chief and primary part of the growth, and the stroma is very poorly developed.

The tendency to cyst formation is much increased by this papillary development. The stroma of these tumors is not often the seat of hyaline degeneration; but it is sometimes myxomatous, though not so commonly as similar growths of the ovary.

The malignant tumors of the thyroid are not yet well classified, and between the types of benign and malignant adenoma we find manifold transitions. It is not uncommon in literature to see cases of "Benign metastasis forming goitre" or "Metastasis from normal thyroid." Honsell has collected eleven similar cases. The papillary adenoma of the thyroid belongs between the benign adenoma and the adenocarcinoma. Pratt classes it among the benign growths, calling it mildly malignant. If we compare it with the true carcinoma and sarcoma of the thyroid it is surely mildly malignant.

In ninety-four autopsies collected by Ehrhardt in which there was either carcinoma or sarcoma of the thyroid, there were only fourteen cases in which there were no metastases. There seems, however, to be no histological reason, except their thick capsule, why these papillary growths should not be very malignant. Wölfler expressed much surprise that in twenty-seven years' duration of his case there had been no

metastases. None of the cases reported, however, show metastases, except possibly those of Ehrhardt and Gunzler, and the last two cases reported in this article. These were invasions through the lymph channels, and not blood infections, which are most common in malignant thyroid growths. Thus we have a relatively benign tumor which occasionally at some future time may become dangerous, though never leading to cachexia.

These proliferating cystadenomata show a certain malignity, in that they tend to recur easily and very rapidly if they are extirpated and there is even a small bit left behind. Similarly, this class of tumors in the ovary, if ruptured within the peritoneal cavity, is liable to scatter the bits of tissue which will lead to a number of new growths on the peritoneum. In operation these tumors should be thoroughly and completely removed, if possible without incising the capsule surrounding the growth. Every precaution should be taken to prevent scattering in the wound bits of tissue, which may become the germs of recurrence. Generally the operation is difficult, as the large vessels and deep structures of the neck may be involved, and it may be impossible to remove all the new growth. In those cases in which the operation was known to have been incomplete there has almost every time been recurrence. In many cases where a complete enucleation of the growth was supposed to have been done there has been no recurrence.

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IX.

A CASE OF DOUBLE MALIGNANT TUMOR OF THE TESTICLE.

By Everett Lee.
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The occurrence of sarcoma and carcinoma in the same subject is not frequent. Their appearance in the same organ is exceedingly rare, and this case is presented not only as an interesting pathological curiosity, but also in the hope that a record of it may prove of value in the study of the etiology of malignant new-growths.

Clinical History. — January 15, 1903, Peter P. entered the Boston City Hospital on the service of Dr. Abner Post, to whom I am indebted for the clinical history of this case.

The patient is a paperhanger, age 29. His mother died of a "tumor of the stomach" at the age of 69. He had the usual children's diseases. Uses no alcohol and smokes moderately.

About eighteen months ago first noticed a slight enlargement of the right testicle, hard, tender, gradually increasing in size. Local pain has never been marked, but for the past two or three weeks has suffered from severe pain in the lower part of the back, so that he has been unable to work. There is no history of trauma. He has never had pain on micturition nor blood in the urine. Denies venereal disease and thinks he has lost some weight.

Physical Examination. — Fairly well developed and nourished. Color fair, beard thin, voice rather high pitched, and he presents an effeminate appearance. Pulse somewhat stiffened, regular, and good volume. Heart: systolic murmur over base and apex. No signs of organic disease. Lungs negative. No resistance or tumors made out in abdomen.

Varicocele and atrophy of left testicle. Right side of scrotum occupied by a large egg-shaped tumor about three inches in length, two and one-half inches wide, with the small end down. Tumor is non-fluctuating, slightly tender and hard to the touch. Testicle as such not made out. Enlarged vessels are felt over the surface of the tumor.

FIG. 1. Low power drawing of carcinoma simplex showing connective tissue stroma forming alveoli filled with cells of epithelial type.

Tumor removed by Dr. Post on January 16. The wound healed rapidly, with very little induration, and the patient was discharged to the out-patient department January 24, 1903.

Description of Specimen. — Right testicle with small adherent nodule measures $8 \times 4 \times 5$ cm., divested of tunics, smooth translucent reddish gray, marked by tortuous engorged vessels and presenting on one side a small mass of ragged adhesions. Cuts with some difficulty. Surface of section coarsely roughened, showing creamy or yellowish gray areas, miliary to .4 cm. in diameter in a translucent grayish smooth

field. No vessels evident inside of mass. No capsule or differentiation externally.

At one end, separated by a firm gray, slightly retracted capsule, is a nodule $2\times1.5\times1$ cm., cutting smoothly and firmly, presenting a homogeneous gray surface.

Specimens were fixed in Zenker's fluid and 10 per cent. formalin, and stained with hæmatoxylin and eosin.

Microscopical examination shows the main tumor mass to be a spindle cell sarcoma, whereas the small nodule is a typical carcinoma simplex.

Reproductions of each are shown in the accompanying figures.

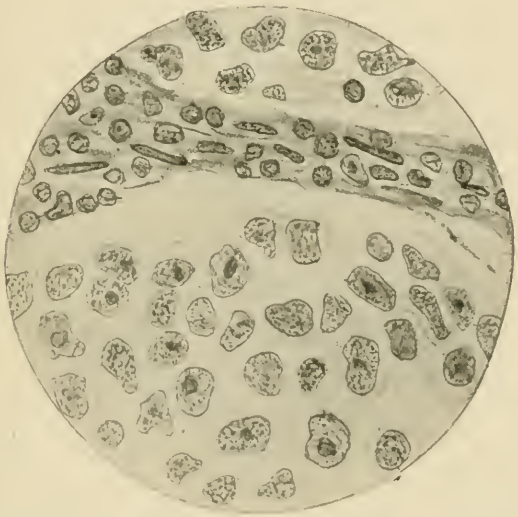

FIG. 2. High power of carcinoma, showing the character of the cells of the stroma and the absence of intercellular substance within alveoli.

Before taking up the pathological aspect of the case a few points of clinical interest present themselves for consideration.

Carcinomata usually occur after middle life. To this rule carcinoma of the testicle is a marked exception. Of all the cases which I have collected most of them were under 35, and many occurred between the ages of 20 and 30.

Of 67 cases collected at random by Keene (1), 51 were in persons under the age of 40, and 24 of these were under 30.

Butlin (2) reports a case of carcinoma occurring in the testicle of a child of 2 years.

It is interesting here to note one other organ in which primary carcinoma occurs at an early age. Moschcowitz (3) found that 67 per cent. of the cases he collected of carcinoma of the appendix occurred in persons under the age of 30, and reports one at the early age of 15 years.

Elting (4) found 24 per cent. under 20 years and 53 per cent. under 30 years.

In regard to sarcoma the age is not notable, occurring as it does from fœtal life to old age (5). Newman (6) reports a case of sarcoma of the testicle in a child $3\frac{1}{2}$ years old.

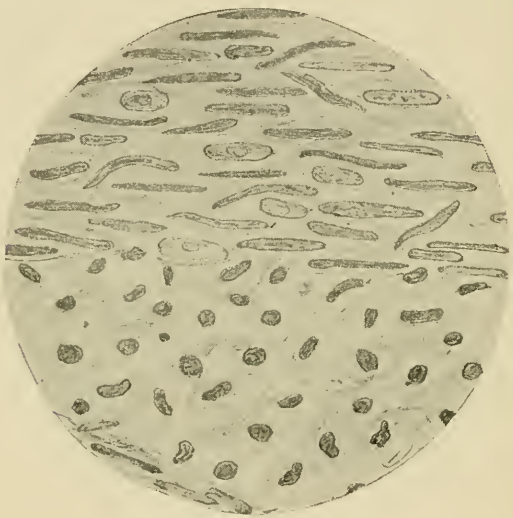

FIG. 3. High power drawing of the spindle cell sarcoma showing bundles set at right angles.

It is asserted by several authorities that carcinoma never occurs in both testicles at the same time, but sarcomata appearing simultaneously in both testicles have been reported. (These cases I have been unable to find.)

The inguinal glands were not involved in this case. This is the rule until the growth extends into the scrotum. The iliac and lumbar lymph nodes are usually involved early in the course of the disease.

Malignant growths of the testicle, as a rule, begin in the gland proper and then gradually extend to the epididymis and cord, the reverse of the tuberculous process.

Carcinomata, according to Langhans (7), usually start in the seminiferous tubules, and Hansemann (8) states that sarcomata spring from the interstitial connective tissue.

Loeb (9) says that double malignant tumors of two different types have been found in the ovary, testicle, kidney, salivary and lachrymal glands, uterus, vagina, and bladder. He does not give the references, and I have been unable to find record of this condition existing in the testicle.

The present case is another of the very short series of cases reported showing two malignant tumors differing in type in one subject. The arguments advanced by Woolley (10) for "system infection," "tissue predisposition," and the like, gain scanty support, at least of a numerical sort, from the literature.

The existence of a single well authenticated case of double malignant tumors of separate type certainly complicates the task of the trauma theory, and renders doubly difficult the acceptance of a parasite theory. Further evidence is certainly required.

Following is a list of selected cases of multiple tumors which may be of value to those interested in this line of work:

CASES.

BECKER (11). Melano-sarcoma of cheek and typical epithelioma of lid. No metastases.

BLACKBURN (12). Man of 80. Sarcoma of dura. Carcinoma of stomach. Sarcoma of testicle.

COLEY (13). Carcinoma of breast with round cell sarcoma in submaxillary region.

CUTLER (14). Spindle cell sarcoma of ovary, carcinoma of suprarenals, heart, lungs, liver, stomach, and intestines.

DOBSON (15). Round cell sarcoma of tonsil two years after amputation of breast for cancer.

EMANUEL (16). Woman, 47. Small round cell sarcoma projecting from wall of uterus which was thickened by the presence of malignant adenoma.

FRANQUÉ (17). Woman, 98. Sarcoma of body of uterus with carcinoma of cervix.

FRANQUÉ (18). Woman, 50. Papillary adenocarcinoma of uterus with round celled sarcoma of cervix.

GUENDE (19). Sarcoma of choroid in woman with cancer of breast.

KRETZ (20). Endothelioma of dura. Carcinoma of œsophagus in man aged 46.

Kummer (21). Sarcoma and carcinoma of thyroid in woman of 55.

Kaufmann (22). Spindle cell sarcoma and carcinoma in a man of 67 years.

Klein (23). Round cell sarcoma and carcinoma in nasal cavity. Mixed at junction.

Loeb (9). Spindle cell sarcoma and adenocarcinoma of thyroid with sarcomatous metastases in lung of rat.

Lubarsch (24). Adenocarcinoma and sarcoma of liver with metastases of both separately and mixed.

Mann and Stranahan (25). Man, aged 72. Epithelioma of penis and endothelioma of dura.

McCrea (26). Female, aged 69. Sarcoma and carcinoma of thyroid with sarcoma of stomach and metastases to lungs and stomach.

Niedergall (27). Papillary carcinoma of fundus of uterus with fibro-sarcoma.

Phillipson (28). Sarcomatosis of skin with carcinomatosis of internal viscera, largest mass in gall bladder.

Scheven (29). Age 44. Sarcoma left striate body, mixed tumor of kidney, cylindrical cell carcinoma of stomach.

Shell (30). Woman, aged 70. Spindle cell sarcoma of right ovary, carcinoma of breast.

Simon (31). Melanosarcoma of right eye, cylindrical carcinoma of liver.

Thierfelder (32). Spindle cell sarcoma of stomach with squamous cell carcinoma of œsophagus in a man aged 70.

Wells (33). Sarcoma and carcinoma in thyroid of dog with metastases of each.

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X.

NOTES ON TWENTY-SEVEN MAJOR CASES IN THE GYNÆCOLOGICAL DEPARTMENT.

By Charles M. Green, M.D.

The 27 cases embraced in this report comprise all in which I performed abdominal section in my service from October, 1902, to January, 1903, inclusive. It may seem that this is a small number of cases, in a four months' service in a large gynæcological clinic, in which major operation should have been thought necessary; but it should be said that this clinic receives large numbers of women suffering with abortion, puerperal infection, injuries consequent on childbirth, or minor pelvic ailments. Furthermore, not all pelvic inflammations received surgical treatment, many cases making symptomatic recoveries with rest in bed and other palliative measures. The major cases that came to operation, therefore, aside from new growths of the uterus and its appendages and intractable retrodisplacements, were cases of chronic pelvic inflammation proved to be otherwise incurable: these latter cases furnish the most difficult gynæcological surgery.

It may be truly inferred that in all major cases not calling for emergency surgery, or not presenting conditions that made speedy operative treatment imperative, sufficient time was taken for observation and trial of non-surgical treatment. Moreover, whenever possible, ample time was taken for the general preparation of patients for operation. Of the 27 cases, one, a case of adeno-carcinoma, was operated upon on the fourth day after admission; whereas another, in which diagnosis was doubtful, was kept under observation until the

39th day. The average time taken for observation and preparation of the patient was 22 days. It may be thought that three weeks is a long average time for patients to await operation. But experience has convinced me that with reasonable delay, and with general, and minor local, treatment, many patients make symptomatic recoveries without operation; and that, in cases that ultimately come to operation, the convalescence is smoother and shorter, and the ultimate results more satisfactory, when sufficient time is taken for the general preparation of the patient.

It has been said in criticism of this view that, especially in pelvic inflammations, delay results in denser adhesions, greater danger of injury to intestine during operation, and much more difficult surgery. But it should also be said that apart from the benefit to the patient of systemic preparation, delay often ensures the physiological sterilization of encysted pus and thus greatly diminishes the danger of peritoneal infection at the time of operation. I believe that many patients are lost by infection after early operation for pelvic inflammation who might be saved by delaying operation, not only for general preparation, but for the natural sterilization of the infecting organisms.

The conditions for which abdominal section was performed are shown in the following table of pathological diagnoses:

Retro-displacements of the uterus		5
Fibro-myomata of the uterus	2	
Fibro-myomata of uterus with malignant adenoma	1	
Myomata of the uterus	1	
	—	4
Adeno-carcinoma of pelvic organs and omentum		1
Multilocular papillary adeno-cystoma		1
Tubal pregnancy, chronic peri-salpingitis		1
Pregnancy with alleged pelvic pain		1
Peri-salpingitis	2	
Chronic salpingitis, generally with pathological ovaries	12	
	—	14
		27

Of these 27 cases, 20 were discharged well, 5 relieved, and 2 dead, — an operative mortality of 7.4 per cent.

Drainage was employed in 11 cases, that is, in 8 cases of chronic salpingitis, and in the cases of tubal pregnancy,

papillary cystoma, and adeno-carcinoma. This is a surprisingly large proportion of drained cases, and quite surpasses my previous experience. The drain was chiefly used to control by gauze pressure venous oozing from separated adhesions: the specific indications and results of drainage will be given in subsequent notes.

In this series of cases, catgut was experimentally used in the abdomen almost exclusively. In the hysterectomies silk was used to tie the uterine arteries, since I hesitated to trust catgut to hold vessels of the size of the uterine. The catgut was prepared with great care, and I saw no ill effect from its use.

The symptomatology, indications for operation, convalescence, and results in this group of cases are shown in the following concise extracts from the hospital records:

1. Retroversion with Prolapsed Appendages and Cystic Ovary.

P. T., 20, married, ii para, since an instrumental delivery at full term two years previously, had had intermittent pain in lower abdomen, worse in left quadrant. For six days prior to admission constant pain of considerable severity. Ctm. unduly frequent. Following a three months' miscarriage, four months before, had "chills and fever." Uterus retroverted: tender mass on left. Improved generally in three weeks, and a systolic murmur disappeared; but recurring attacks of abdominal pain for two years and the presence of a left pelvic mass with retro-displacement of uterus gave a clear indication for operation.

Operation. — Uterus flabby and retroverted; no adhesions; appendages prolapsed. Both tubes pervious; right ovary slightly enlarged, left ovary cystic; cysts laid open and ovary closed in with catgut. Ventro-suspension. Abdomen closed with mass interrupted silkworm gut sutures, with running suture of catgut in peritoneum. Operation 40 minutes.

Convalescence uninterrupted. Discharged well on the 27th day.

2. Retroflexion of Uterus, Prolapsed Appendages, Adhesions.

I. T., 38, married, i para, since a premature labor at eight months, twelve years ago, has complained of bearing down pain, backache, pain in the legs, and occipital headache. In several years defecation has been painful and movements bloody. Has worn a pessary for six months without relief. Uterus retroverted, fundus tender. Uterus replaced and pessary fitted. Observed for three weeks and pessary changed several times; but pain in back, lower abdomen, and legs persisted: general condition much improved.

Operation. — Wall thick; uterus flabby and retroflexed. Light adhesions easily separated. Appendages prolapsed, markedly congested, and with light adhesions. Fimbriæ pervious, ovaries apparently normal. Adhesions separated, ventro-suspension of uterus with catgut; abdomen closed with mass suture. Operation 35 minutes.

Convalescence uneventful. Discharged well on the 25th day: abdominal scar satisfactory, uterus in apposition with anterior abdominal wall.

3. Retroversion and Retroflexion of Uterus, Prolapsed Appendages, Cystic Ovary.

A. M. H., 23, married, i para, since full term labor three years previously, had had constant pain in lower left abdomen and back, and the ctm. periods had lasted ten or twelve days: for three months had flowed the greater part of the time, using four to six napkins daily. Uterus retroflexed and retroverted to third degree; considerable pelvic tenderness; left tube and ovary prolapsed.

After local depletion and relief of tenderness the uterus was easily replaced and a pessary fitted; but after more than three weeks of treatment the symptoms persisted, the left appendages remained prolapsed, and the pessary was not well borne; operation was therefore thought advisable.

Operation. — Uterus free, flabby, retroverted and flexed; appendages prolapsed, but without adhesions. Both tubes patent and normal in appearance. Right ovary normal; left ovary cystic; cysts laid open and oozing controlled with catgut. Ventro-suspension of uterus. Peritoneum closed with running catgut suture, other layers with mass suture of silkworm gut. Operation 30 minutes.

Convalescence uninterrupted except for burning micturition, which persisted for three weeks. Discharged well on the 28th day; uterus in apposition with anterior abdominal wall, appendages apparently normal, abdominal scar firm.

4. Retroversion of Uterus, Prolapsed Appendages with Adhesions.

G. H., 36, married, a two-months' abortion six years ago. Much debilitated for past two months, and for a week constant sharp pain in left lower quadrant running down left leg. For two or three years had had more or less constant pain in left ovarian region, and numerous acute attacks of pain with chills and vomiting. Entered with P. 100, T. 101°; uterus retroverted and tender; left appendages prolapsed; right ovary apparently enlarged and tender. It was learned that patient had had four vaginal operations in last four years, one a vaginal fixation; in view of this history and the local conditions found it seemed advisable to open the abdomen.

Operation. — When the patient was brought to the table pulse and respiration were found to be very poor; but they improved sufficiently under stimulation to warrant opening the abdomen. Uterus found retroverted, right tube and ovary slightly enlarged, left tube and ovary enlarged, prolapsed, and adherent; adhesions freed. By this time pulse

and respiration were of such a quality that it seemed injudicious to do more than suspend the uterus; abdomen closed with mass sutures.

Convalescence. — Patient made a good ether recovery and an excellent convalescence: neurasthenic complaints were frequent. On the twenty-seventh day the uterus was found held suspended in normal position, the left ovary prolapsed; the right appendages were not made out. Abdominal scar satisfactory. Discharged relieved, and asked to report later.

Four months later: vagina presents no lesion; uterus in normal position; right appendages not palpaple; left appendages no longer prolapsed. [This case illustrates very well the beneficial effects on prolapsed, congested, and painful tubes and ovaries of correcting by pessary or by ventro-suspension retro-displacements of the uterus. Holding the uterus in normal position not only tends to restore the position of the prolapsed appendages ; but the consequent improvement in the pelvic circulation has a most salutary effect on swollen and tender tubes and ovaries. I have observed these results in many cases.]

Note. This patient contracted syphilis soon after returning home from the hospital, and was referred to the O. P. D. for treatment.

5. Retroversion of Uterus, Prolapse of Appendages, Adhesions.

B. M., 21, single, two criminal abortions two years and one year previously; profuse vaginal discharge for three years. Three months before entrance was in bed a week with hypogastric pain, profuse leucorrhœa, and frequent, burning micturition. On admission patient was having her fourth similar attack; P. 108, T. 101°. Uterus retroverted and buried in a mass of exudate. In the next three weeks the general condition improved steadily, there was a considerable absorption of exudate, and the uterus became more movable; but there was a nearly constant complaint of pain in the lower abdomen, and on the 24th day it was thought best to open the abdomen.

Operation. — There were light adhesions attaching the peritoneum of the anterior surface of the broad ligament over the anterior face of the uterus as high as the fundus; both appendages prolapsed and adherent; uterus retroverted and held by light adhesions: all adhesions separated. Ovaries found normal ; right tube patent ; left tube occluded by adhesions of fimbriae, but these were removed and the fimbriated end opened. Tubes and ovaries congested; but it was thought to be unnecessary to remove them. Ventro-suspension of uterus. Peritoneum, muscle and fascia closed with interrupted catgut sutures, the skin with superficial silkworm gut. The abdomen was left filled with salt solution with a view to minimizing the risk of post-operative adhesions.

Convalescence progressed favorably until the 22d day, when patient developed otitis media requiring paracentesis tympani, so that she was unable to sit up until the 36th day. The uterus was found in normal position, the abdominal scar satisfactory, and nothing abnormal was found in the pelvis: discharged, well of pelvic disease, to the Aural O. P. D.

6. Multiple Fibromata Uteri with Hyperplastic Endometritis.

S. M., 38, married 13 years, 0 para, had felt debilitated for a year, soreness in lower abdomen for six months, and had had menorrhagia for a year. Anaemic on entrance, with a systolic murmur. Abdomen distended and tympanitic. Rising from the pelvis nearly to the umbilicus, an irregular, lobulated tumor, tender on pressure, apparently a multiple fibroid. Under treatment for over six weeks in hospital before operation, general condition improving steadily. For first three weeks pulse ranged from 90 to 100, for second three weeks from 70 to 80: on 14th day haemoglobin = 60%, on 41st day, 75%. Menorrhagia controlled by vaginal packing.

Operation. — Median incision from umbilicus to symphysis, wall nearly two inches thick: tumor free on the left, on the right adherent to intestine; large mass filling the pelvis. Adhesions to gut tied off and cut, uterus raised, supra-vaginal amputation with bilateral appendectomy. The right ovary was adherent to bottom of pelvis and a portion was left and covered into the broad ligament. Cervical canal cauterized with carbolic acid. Cervical stump closed in and covered in with the broad ligaments with running catgut stitch. The uterines were tied with silk; elsewhere catgut was used. Time 2½ hours.

Convalescence uninterrupted: on day following operation T. rose to 100.8°, on second day to 100.2°, after this normal. Discharged well on the 27th day, with a firm abdominal scar.

7. Multiple Myomata Uteri.

C. S., 40, married 20 years, had been an invalid ever since a miscarriage seven years previously which had been followed by septic pelvic inflammation: had suffered much from melancholia. There was a hard mass rising from the pelvis half way to the umbilicus: the uterus was evidently enlarged, partially movable, and there was a mass on the left, thought to be possibly a fibroid growth, but more likely, in view of the history, inflammatory. Operation was sought, under advice, in the hope of alleviating the mental condition.

Operation on the 11th day, after sufficient preparation. Abdominal wall very fat. Uterus found to be the seat of multiple fibroids, and the mass on the left was a part of the new growth: appendages apparently normal. Super-vaginal amputation, cervical canal cauterized, cervix and broad ligaments closed over with running silk suture. Abdomen closed with mass sutures. Operation 2½ hours. Considerable shock at close of operation, but patient responded well to stimulation.

Convalescence progressed without interruption except for a small abscess resulting from a subcutaneous injection: out of bed on the 22d day, and discharged well on the 37th day: cervical stump central and movable, no induration in pelvis, abdominal scar satisfactory. [The stay in hospital until the 35th day was due to the hyperdermic abscess above mentioned. The operation was entirely successful so far as the removal of the tumor is concerned; but the ultimate effect on the mental condition is not yet known.]

8. Multiple Fibro-Myomata Uteri, Subserous, Interstitial and Submucous.

A. M., 49, single, never pregnant, for a year had been flowing off and on the greater part of the time, using from one to twenty napkins daily; for six months the vaginal discharge had had a very foul odor, and there had been pains in the back and lower abdomen. Patient was undersized, presenting almost the appearance of a Cretin: the legs were short, feet small; the right arm had not developed since early childhood and was useless. There were anaemia, debility, and emaciation. Uterus enlarged, retroverted, partly filling the pelvis, evidently the seat of multiple fibroids.

Operation on the 20th day after admission: abdominal wall very thick, considerable fat infiltration over the peritoneum; only a few adhesions. Supra-vaginal amputation and bi-lateral appendectomy: uterines tied with silk, catgut elsewhere. Cervical canal cauterized with carbolic acid; usual peritoneal toilet. Tumor found to consist of a pedunculated submucous fibroid, several interstitial fibroids, and one pedunculated subserous growth. Operation 2 hours: pulse 120, but of good quality, on leaving the table.

Convalescence. — Good ether recovery, with no vomiting.

1st day. Morning pulse and temperature, 104 and 99.8°; urine voided in good amounts; very slight distention; considerable pain; excellent facies; no vomiting at any time; general condition most satisfactory. Evening, pulse rose to 120, but continued of excellent quality during the night; T. 101°.

2d day. Bowels moved freely several times, urine in fair amount. Pulse rose to 140, but retained its quality.

3d day. In early morning pulse rose to 160, still of good quality, T. 104°, respiration somewhat embarrassed; abdomen moderately distended. Color good, tongue moist, subjectively fairly comfortable. Pulse continued at 160 throughout the morning, temperature falling to 102.5° at 8 A.M. Two high turpentine enemata given the previous night caused expulsion of large amounts of gas. Bowels moved twice this morning. Shortly after noon pulse failed rapidly, respiration became more embarrassed, and general condition deteriorated rapidly. Patient failed to respond to vigorous stimulation, and died at 3.40 P.M.

Autopsy (partial). — A small amount of free bloody fluid was found in the abdominal cavity: intestines very much distended, but of normal color and with their normal lustre. Behind the cervical stump were some thin adhesions running to the posterior pelvic wall: no adhesions found elsewhere. A swab from the abdominal cavity showed the staphylococus pyogenes aureus.

9. Multiple Myomata Uteri, Malignant Adenoma.

A. L. M. V., 47, a widow 15 years, ii para. Menstruation had been perfectly normal up to four years previous to entrance; since then had flowed constantly, using 3–4 napkins daily; for six months the discharge had been foul. No pain. Had felt debilitated of late. Uterus somewhat enlarged, but movable and in normal position; cervix slightly

patulous, but smooth and not the seat of erosions. No masses felt in pelvis.

Under ether, five days after entrance, uterine cavity found to be capacious and five inches in depth, somewhat deeper in left cornu: there was an irregular bulging on anterior face and in both cornua evidently multiple fibroids. With a sharp curette a large amount of grumous material looking like sarcomatous tissue was removed; pathological report, malignant adenoma. In view of this report and of the fibroids present, hysterectomy was decided on.

Operation two weeks after entrance: total hysterectomy by combined abdominal and vaginal routes. Cervical canal closed in with stout silk sutures: anterior and posterior incisions at cervico-vaginal junctions, blunt dissection of cervix from bladder to peritoneal reflex, and posteriorly as far as peritoneum, spaces filled with gauze. Median abdominal incision: uterus found to contain ten or more small fibroids, no adhesions. Classical hysterectomy, the gauze in anterior and posterior fornices serving as a useful guide; uterines tied with silk, otherwise catgut. Peritoneum closed over the broad ligaments and vaginal vault; abdomen closed without drainage, vaginal walls at vault closed in from below. Time of operation 2 hours 40 minutes. Condition excellent throughout operation, good ether recovery.

Convalescence. — Temperature 101° on 4th day, normal on the 7th, sat up on the 24th day. Abdominal and vaginal scars satisfactory, pelvis empty. Discharged well on the 29th day: ultimate results unknown.

10. Adeno-Carcinoma of Pelvic Organs and Omentum.

L. S., 45, single, i para, for two months had noticed a gradual increase in the size of the abdomen with bloody vaginal discharge : for two weeks, constant pain in upper abdomen and back : for ten days dyspnœa and vomiting. Abdomen symmetrically enlarged, marked fluctuation wave, dulness in flanks and below umbilicus. Vagina small, cervix displaced forward and upward behind symphysis. Indefinite resistance below umbilicus, abdominal wall too thick to make out a definite mass. It was thought the tumor might be uterine, but more likely an ovarian papilloma.

White count = 13,000 ; moderate achromia ; no poikilocytosis ; no nucleated reds. Differential count of 500 whites: polymorpho-nuclear leucocytes, 83.1% ; lymphocytes, large and small, 16.6%; one eosinophile seen.

In view of the rapidly increasing abdominal tumor, attended by pain and dyspnœa, an exploratory cœliotomy was thought advisable.

Operation. — Median incision followed by escape of large amount of bloody ascitic fluid; lower abdomen and pelvis filled with a growth flesh-like and cystic in appearance, which involved the whole lower portion of the omentum, the neighboring intestines, and the pelvic and lower abdominal parietes. A cyst of the size of a cocoanut projected from the right side of the general mass. Lower portion of the omentum tied off and removed; some portions of the intestines freed from adhesions; large cyst above mentioned emptied and an upper portion removed. Neither uterus nor appendages could be differentiated.

Abdominal cavity thoroughly irrigated with salt solution; abdomen closed with gauze drainage. Time of operation 1 hour 10 minutes. Patient's condition excellent throughout, good ether recovery.

Convalescence was moderately febrile. Two sinuses developed in the incisions and a smear showed the staphylococcus pyogenes aureus; but the sinuses and the discharge gradually diminished, and patient gained in her general condition. Sat up on 21st day, and on the 35th was about the ward. There was one slight sinus, and a solid tumor was evident midway between umbilicus and pubes; but patient was very comfortable. She was discharged relieved.

11. Multilocular Papillary Adenocystoma.

C. W., 31, married, iii para, had a full term labor 2½ years before admission and was told by her attending physician that she had a floating abdominal tumor; but other than enlargement of the abdomen patient had no symptoms until within six months, during which time she had had shooting pains all over the abdomen; for two weeks prior to entrance pain had been constant and severe. Ctm. had been regular; but the last period was very scanty: for three days had vomited on taking anything by mouth.

Facies anxious. Abdomen symmetrically enlarged from pubes to ensiform, marked ascites, uterus not palpable, but an indefinite mass between symphysis and umbilicus. Cervix low in pelvis, slight tear of perineum; beginning rectocele, moderate cystocele. T. ranged between 98° and 100°; P. in vicinity of 110, of good quality. Operation thought advisable on account of the amount of pain and the presence of abdominal tumor with ascites.

Operation after four days' preparation. On opening the peritoneum a large amount of straw-colored ascitic fluid was discharged. A large unilocular cyst, surmounted by several smaller cysts; one, firmly adherent to the liver, had undergone degeneration, apparently malignant. Numerous adhesions to omentum. Pedicle tied off at right broad ligament, cyst and right tube removed without rupture. Moderate oozing from the surface of the liver whence an adherent daughter cyst had been removed necessitated a gauze pack; abdomen closed except at upper end of incision where gauze strips emerged. Time of operation 55 minutes.

Convalescence. — Patient was practically out of ether on leaving the table: considerable vomiting. Pulse 152 of poor quality, dropped to 116 in late afternoon, rose to 144 at midnight with tendency to irregularity and poor quality. Temperature, 97.4° after operation, rose to 101.° in evening. Marked improvement after the first day, and convalescence was uninterrupted. Gauze drain first changed on 3d day: sinus closed in rapidly and was healed on 10th day, when all stitches were removed. Out of bed on the 21st day, and was discharged well three days later.

Subsequent History. — At time of operation above described it was not suspected that patient was pregnant, yet the sequel showed that she must have been two months advanced. In May, 1903, she was re-admitted profoundly septic, giving a history of a full term delivery five

days before: a neighbor had put her hand into patient's vagina and removed placenta. Entered with P. 150, T. 101.8°, the latter rising to 104.2° five days later; during the first ten days was delirious most of the time, and on several occasions became wildly maniacal. General condition finally improved, the mind cleared, and patient was discharged in good health.

12. Tubal Pregnancy, Chronic Peri-Salpingitis.

T. P., 22, married, iii para. Five months before admission had a 2½ months' abortion, said to have been induced by drugs: the puerperium was attended with severe pain in lower abdomen for seven days. Three weeks before admission, believing herself to be two months pregnant, after a car-ride she commenced to flow and continued for two or three days: no clots passed, but a piece of tissue of the size of a hen's egg was said to have come away. There was no subsequent flow, but constant pain in lower abdomen, worse on the left. Five days before entrance had chills nearly all day: chilly and hot sensations for several days.

On admission appeared very sick: anæmic, debilitated, and emaciated. Abdomen tympanitic and diffusely tender, there being exquisite sensitiveness to pressure and marked spasm over the left lower quadrant. P. 92, T. 101°. Vaginal examination unsatisfactory owing to tenderness, but it revealed a tender mass behind and to the right of the uterus. Case observed for over three weeks; there was a fluctuant pulse and temperature, but the general condition improved steadily, although there was a complaint of considerable continuous pain in the left quadrant. The history of supposed recent abortion, the course in hospital, symptoms, and local examination, all pointed to a sub-acute exacerbation of a chronic pelvic inflammation, and on the 24th day the abdomen was opened with that diagnosis.

Operation. — Adhesions of intestine and omentum to the uterus, bladder, and anterior abdominal wall separated with much difficulty: free hemorrhage was stopped by gauze pressure. The left appendages, freed from their adhesions, looked healthy and were left in situ. Right tube and ovary much enlarged; after removal the tube was laid open and found to contain old blood clot, and the subsequent pathological report on the specimen was "Tubal Pregnancy." The ovary was so adherent in the bottom of the pelvis that a part was left, it was therefore thought best to drain. Time of operation one hour.

Convalescence uneventful. Highest temperature 100.4°. Patient out of bed on 21st day. General condition steadily improved, pain disappeared, abdominal wound healed well. Discharged well on the 26th day, with a small granulating area in the scar.

13. Pregnancy, with Alleged Pelvic Pain.

J. M., 31, married, said to have had a 4½ months' miscarriage three years previously, gave this history: For a year and a half had had more or less constant pain in right lower quadrant, severe for past six weeks; vomiting, but no chills and fever. Last regular period

late in July, 1902, and did not flow again until three weeks before entrance (Oct. 2): then flowed for five days, using five napkins daily. Many small clots came away, and one large one of the size of a hen's egg. [A credible history of a six-weeks' abortion.] Slight flow until within ten days. Claimed to have entered on account of pelvic pain. In November, 1897, had a left salpingo-oöphorectomy by Dr. Gay in B. C. H. Now sent into the hospital from the O. P. D. with the diagnosis of "Pelvic mass, extra-uterine pregnancy?"

On entrance did not look sick, abdomen lax, tenderness (?) over the uterus and in region of appendix, old scar in median line below umbilicus; movable pelvic mass on right, thought to be closely attached to uterus, which did not seem to be enlarged; left side of pelvis empty. Case taken under observation. Patient ran a slightly elevated temperature and a normal pulse; general condition excellent. Subsequent examinations showed no change in conditions previously noted. Suggestion was made by the Junior House Physician that patient was normally pregnant, and in view of this suggestion I re-examined with great care. But finally, after twelve days' observation, in view of the former operation by Dr. Gay, the credible history of recent abortion, the admission diagnosis, the patient's complaint of pain for a year and a half, and the palpable mass in the right side of pelvis, I opened the abdomen, expecting to find an ovarian or parovarian cyst, a tubal pregnancy, or possibly an inflammatory mass, but found myself deceived.

Operation. — Right tube and ovary normal, the right ovary containing a corpus luteum; uterus enlarged to 2½-3 months' pregnancy, but strongly right-latero-verted. [The fundus and corpus thus constituted the movable mass, "closely attached to the uterus," felt by several examiners.] Nothing abnormal was found. Abdomen closed in layers.

Convalescence uninterrupted. Patient evinced no surprise when informed that she was pregnant, but maintained a sullen frame of mind and was obviously disappointed that pregnancy had not been interrupted by operation. Discharged well, with a good scar, on the 26th day.

Subsequent History. — When about six months pregnant patient was readmitted with symptoms of threatening miscarriage. What she had done or had had done, I do not know; but she was evidently determined to miscarry. The symptoms of impending miscarriage disappeared, however, and she was again discharged. She was subsequently delivered at full term in the Boston Lying-in Hospital, after a normal, O. L. A., labor.

14. Acute Peri-Salpingitis, Cysts of Ovary, Corpus Hæmorrhagicum.

M. W., 32, married, ii para, two weeks before entrance had overrun her expected ctm. by six weeks, when she commenced to have a slight flow, backache, and cramps in lower abdomen; the slight flow ceased in one week, but for the succeeding week there was constant severe pain in right lower quadrant; no vomiting or chills. Had had no previous similar attack. Seemed to be in good general condition, but had P. 84, T. 100.2°. Uterus retroverted and embedded in exudate; a tubal mass on the right, and a mass behind, and to the left of, the uterus. General

condition steadily improved, but there was more or less constant pain in the right lower quadrant. After observation for over three weeks, operation was thought advisable.

Operation. — Bladder adherent to right tube over about one half its surface; recent adhesions between uterus and tubes, both of which were displaced backwards and behind the retroverted uterus; fimbriated end of right tube obliterated, tube distended; right ovary, the size of a hen's egg. Right salpingo-oöphorectomy; ovary, ruptured in removal, contained bloody serum, and hanging from the cavity was a bit of tissue suggesting ovarian pregnancy ; the right tube contained clotted blood. Left tube looked normal for more than one-half its length; but fimbriated end was occluded: this end was resected, the end split, and attached to the left ovary, which appeared healthy. Ventro-suspension of uterus. Time of operation, 1 hour 25 minutes.

Convalescence uninterrupted: out of bed on the 22d day; discharged well on the 27th day. Short linear abdominal scar, right broad ligament empty, appendages on left palpable but not tender, uterus in apposition with anterior abdominal wall, some exudate remaining in post-uterine fossa, which, however, was not tender.

15. Peri-Salpingitis, Endometritis.

A. S., 21, married, ii para, had a miscarriage 11 months previously, and since then had had constant pain in left lower quadrant : ctm. periods had lasted about two weeks, four napkins daily; profuse, thick, foul vaginal discharge. Uterus found freely movable in normal position; slight laceration of cervix, not needing repair; right tube swollen; left tube prolapsed and tender. After ten days' observation, in view of prolapsed appendages, and unrelieved pain and tenderness in lower abdomen for nearly a year, it was decided to operate.

Operation. — Curettage of uterus. Median incision : no intestinal adhesions; both appendages prolapsed and adherent by light adhesions. There was no mass on the right, as had been thought. Fimbriated ends pervious; ovaries slightly enlarged; but it was thought best not to remove them. Adhesions freed, abdomen closed with layer sutures.

Convalescence uninterrupted. Discharged well on the 29th day.

Subsequent History. — Three and a half months later patient reported at hospital in excellent health; uterus movable in normal position, right appendages normal, left tube and ovary prolapsed, but not tender.

16. Chronic Salpingitis, Ovarian Abscess.

G. B., 21, single, o para, had "inflammation of the bowels" six years previously, with which she was laid up for six weeks. A week before entrance, recurrent attack with pain in back and lower abdomen. Poor general condition ; P. 108, T. 99.8°. Abdomen tense and tympanitic, tender in lower quadrants; boardy mass behind uterus extending to both sides; appendages not differentiated. The continuance of symptoms after three weeks of treatment and observation led me to operate.

Operation. — Appendages found enlarged, thickened, and densely adherent: bi-lateral salpingo-oöphorectomy without rupture; but the left

ovary was so densely attached to the rectum that a portion was left. Considerable oozing from adhesions, and abdomen closed with gauze pressure drain. A swab from pus contained in right ovary showed bacillus coli communis. Time of operation, 1 hour 55 minutes.

Convalescence. — Temperature on 1st, 2d, 4th and 6th days rose at night to 100° to 101°, otherwise within normal limits. Pulse ranged from 110–140. Moderate discharge from drain, but sinus healed in well. On 6th day a dissecting abscess was discovered deep in lower angle of incision; this healed completely in ten days. General condition constantly improved. Out of bed on 27th day; discharged well on the 52d day, the sinus having healed except for a granulating depressed area in skin, $\frac{3}{4}$ inch deep.

17. Sub-acute Salpingitis, Abscess of Ovary.

F. G., 21, single, miscarried at three months, eight days before entrance. On admission looked sick, P. 104, T. 99.2°. Abdomen distended, and tender to deep pressure especially over left lower quadrant, where an indefinite mass could be felt rising from the pelvis. By vaginal examination a hard, tender mass could be felt behind the uterus. There was considerable pelvic pain the first few days after entrance. White count 16,800. Widal test negative. During four weeks' observation there was a steady improvement in general condition, the white count dropped to 12,000; but the pelvic mass remained unchanged, tenderness remained, and patient had constantly recurring febrile attacks, with temperature ranging as high as 103°. Operation was clearly indicated.

Operation. — Adhesions of omentum to uterus and anterior face of broad ligament; left appendages and a six-inch loop of large intestine densely matted together and adherent to the bottom of the pelvis. The left tube and ovary were removed with great difficulty, but without rupture; in separating the intestinal adhesions, however, the gut was torn through nearly half its diameter; the rent was carefully isolated, closed in with fine silk, and a gauze drain and pad placed over it. Time of operation, 2 hours 10 minutes. During operation pulse ranged 100 to 110, and became of very poor quality.

Convalescence. — Patient left the table in a state of profound shock, but gradually improved under vigorous stimulation. Continuous vomiting and moderate abdominal pain the following day. At the first dressing, on this third day, wicks had a marked fecal odor, but no fecal matter was seen, and there was no further sign of fecal fistula. The bowels were not moved until the sixth day, and then freely with salines. Temperature rose to 101° on second day, with pulse at 120, but gradually dropped to normal. Wicks finally omitted on 21st day, sinus closed in gradually. Patient was out of bed on the 24th day, and was discharged well on 33d day, the abdominal wound being well healed except for a small granulating area.

18. Chronic Salpingitis, Adherent Retroversion of Uterus.

I. F., 34, married, ii para, since full-term labor ten years ago, had had pain off and on in the left lower quadrant; laid up in bed many

times with this pain, accompanied by chills, fever, and vomiting. Present attack began three months previous to entrance. On admission, abdomen slightly rigid, considerable tenderness in both lower quadrants and in epigastrium. P. 92. T. 99.6°. Uterus retroverted and imbedded in a tender mass of exudate ; left appendages prolapsed and tender. After ten days pulse and temperature ranged within normal limits and the general condition had improved considerably ; but the constant complaint of pain, the history of long invalidism, and the pelvic condition clearly indicated operation.

Operation. — Uterus found retroverted and adherent. Left appendages prolapsed and adherent ; tube somewhat swollen at distal end, but patent ; ovary only slightly enlarged; adhesions separated and left appendages allowed to remain in situ. Right appendages prolapsed and adherent; tube enlarged and fused with ovary, right ovary enlarged; right salpingo-oöphorectomy without rupture; ventro-suspension of uterus. Time of operation, 55 minutes. Excellent condition during operation.

Convalescence satisfactory until 18th day, when patient began to vomit, had frontal headache, diminished urine, and epigastric pain. Vomiting became excessive, put on rectal feeding, general condition deteriorated. The vomiting could not be explained by either the pelvic or the renal condition : the uterus was in normal condition, the right broad ligament empty ; there was slight pelvic tenderness, but no more than could be attributed to retching. Inquiry into past history showed that four years before patient had had hæmatemesis, this with epigastric pain suggested some chronic gastric lesion. Patient was transferred, relieved of pelvic symptoms, to first medical service, whence, after observation for several days, she was transferred to one of the surgical services. Five days after leaving my ward patient had gastro-enterostomy, when it was found that the pylorus and duodenum were firmly held to posterior wall by old adhesions of unknown origin. After operation vomiting gradually became less and less, and finally ceased in sixteen days; in three weeks patient was free from symptoms, and was discharged relieved, for observation in out-patient department.

19. Chronic Tubercular Salpingitis.

M. H., 27, married, i para, since full-term childbed seven years before entrance had had more or less constant pain in lower abdomen, which had increased in severity during the past few months; debilitated and emaciated. P. 100, T. 100°. A small tender mass found in right broad ligament, which under observation increased in size; there was also increased resistance over left broad ligament. Operation was deferred until the 26th day, by which time the general condition had considerably improved.

Operation. — Omentum adherent to anterior abdominal wall; separated and tied off. Bi-lateral masses directly adherent to intestinal wall, which was apparently involved in the inflammatory process; moderate oozing from adhesions. Bi-lateral salpingo-oöphorectomy, both tubes being ruptured in removal. [Swab taken from pus negative.] Pelvis carefully wiped out, a drain placed behind each broad ligament,

and a gauze strip laid over the intestine which had been adherent to left tube. Operation, 1½ hours. Condition excellent throughout, but there was considerable respiratory embarrassment from excessive secretion of mucus; good ether recovery.

Convalescence. — Very little shock. On removal of wicks on the 4th day considerable fecal matter was found adherent, and fecal discharge through the sinus continued while patient was in hospital. General condition steadily improved; out of bed on the 30th day. Discharged relieved on the 56th day; uterus in normal position, nothing abnormal found; still some escape of liquid feces and gas from the sinus. Placed in charge of the O. P. D. for observation and treatment of the fecal fistula.

20. Chronic Salpingitis with Acute Exacerbation.

A. D., 23, widow, i para, had had constant pain in lower abdomen for four days, and general abdominal soreness for two weeks previously: had been flowing profusely for a week, passing clots; was in B. C. H. six months before with vulvo-vaginal abscess. Uterus slightly enlarged, induration on the left, on the right a hen's egg mass, — doubtless gonococcus infection. Pulse and temperature ranged from 90 to 100 and from 99° to 100°, respectively.

Operation. Omental adhesions separated or tied off; left tube and ovary prolapsed and adherent, tube distended at fimbriated end and fused with ovary; right tube thickened (larger than the thumb), and fused with ovary, which was two inches in diameter. Bi-lateral salpingo-oöphorectomy without rupture of masses; ventro-fixation of uterus. Time of operation, 1 hour 25 minutes.

Convalescence uninterrupted; out of bed on 21st day; discharged well on 24th day, uterus held in normal position, broad ligaments empty.

21. Acute and Chronic Salpingitis, Cysts of Ovary, Corpus Haemorrhagicum.

K. M., 26, widow, iii para, had had one full term labor and two criminal abortions; over a year previous to entrance had an attack of pain in left lower abdomen of a week's duration, and on admission was suffering with a recurrent attack. P. 98, T. 102°. Uterus pushed forward, behind it a tender, fluctuant mass. After a few days pulse and temperature dropped to normal, and in three weeks absorption of exudate had so far taken place that the uterus was movable in normal position; but a distinct tender mass was palpable on the left.

Operation. Extensive recent and old adhesions; bladder drawn up and adherent over and behind fundus of uterus; both tubes enlarged, and distal openings obliterated, ovaries cystic. Bi-lateral salpingo-oöphorectomy and ventro-fixation. Appendages removed without rupture. Gauze pack placed behind uterus to control oozing. Time of operation, 1 hour 25 minutes.

Convalescence. Temperature reached 102.2° on second morning, but was normal on the sixth day; for first two days there was moderate

abdominal distention and considerable pain, after this convalescence was uninterrupted. Blood count second day after operation, 31,000; on sixth day, 10,400. Wicks removed on 12th day; sinus closed; out of bed on 23d day; discharged well on 28th day; uterus in apposition with anterior abdominal wall, no exudate in pelvis, scar satisfactory. There was a ¼ inch area of granulating surface at the lower angle of incision.

22. Chronic Salpingitis and Chronic Oöphoritis.

I. B., 23, single, ii para, had had two criminal abortions, the second five months before entrance. For three weeks after second induction was sick in bed with pain in lower abdomen, chills, and fever. Two weeks before admission had a recurrent attack, pain, chills, and vomiting. Looks sick, debilitated, and emaciated; abdomen tense, tympanitic and very tender; P. 100, T. 101.4°. Uterus tender, bi-lateral masses. Owing to poor general condition; operation was postponed until the 27th day, with steady general improvement.

Operation. Large intestine adherent to uterus and abdominal wall. Bi-lateral masses felt buried beneath the gut densely adherent. Many adhesions were separated on the left, half way down on the posterior wall of the uterus. On the right most of the tube was freed: but a large ovarian mass was left concealed below the intestine. Neither tubes nor ovaries were ruptured. After working thirty-five minutes in freeing adhesions I felt it wiser to retreat; the abdomen was washed out with salt solution, left filled with the same, and closed without drainage. Excellent condition throughout operation, and good ether recovery.

Convalescence uninterrupted. T. never higher than 100.8°, and normal on third day. Complaint of slight pain for two weeks; steady general improvement. Out of bed on 24th day, discharged relieved on the 28th day. Discharge note: uterus in normal position and fairly movable; larger mass on right still palpable, but much diminished in size; nothing felt on left.

[This is one of several cases in which I have observed marked benefit from partial freeing of adhesions, even when pathological appendages have been left in situ. The operative procedure appears to stimulate metabolic processes, and incite absorption; the process is, of course, favored by the usual four weeks' rest in bed. More than once I have seen complete symptomatic recovery follow those incomplete operations]

23. Chronic Salpingitis and Ovarian Abscess, Retroversion.

A. M., 42, married, iii para, spoke no English and could give no satisfactory history. Complained of pain in lower abdomen, and for three weeks had had a constant bloody vaginal discharge. Looked debilitated, P. 100, T. 99.8°. Cervix lacerated and cystic; uterus fixed; dense resistance behind and to the right; hen's egg mass on right. Patient constantly complained of pain during observation of three weeks.

Operation. Curettage of uterus. Abdomen opened; uterus quite large, looking like a two months' pregnancy; intestine densely adherent to posterior uterine wall and to both appendages, — some adhesions cut,

and some, adherent to uterus, left undisturbed as they did not interfere with access to the appendages. Abscess of both ovaries. Bi-lateral salpingo-oöphorectomy; uterus fixed to anterior abdominal wall. Both tubes were ruptured in removal; but the general cavity and intestines had been well walled off with gauze: later, the tubal pus was shown to be sterile. Abdomen closed, with dry gauze drain behind each broad ligament. Good condition throughout, and good ether recovery. *Convalesence* very satisfactory; highest T. 100.2°. Complained of only moderate pain. Gauze drain removed on second day, and provisional sutures tied. Out of bed on 30th day, discharged well on 39th day.

Of the last ten cases, 14 to 23 inclusive, all cases of salpingitis, five were drained; four of the drained cases and three not drained were discharged well; two not drained were discharged relieved; one drained case, tubercular salpingitis, was discharged relieved of symptoms, and indeed well except for a small fecal fistula. The subsequent history of this fistula I do not know; but the patient was placed under observation in the out-patient department, and has not, to my knowledge, been readmitted to the hospital.

The four following cases are grouped together to illustrate the danger in drained cases of post-operative infection. Through an unfortunate error in judgment these four cases, after operation, were placed in a small ward, in which, without my knowledge, was a patient with a pelvic abscess under the care of another member of the staff; this patient had had a vaginal section. There was a profuse secretion of pus from the abscess cavity that contained the streptococcus pyogenes and the staphylococcus pyogenes aureus. When my four cases showed signs of infection the source was sought for and presumably found, and the case of pelvic abscess was transferred.

24. Chronic Salpingitis Oöphoritis.

S. W., 25, v para, had had operation for appendicitis three months before admission, in another city. Ever since this operation she had had constant sharp pain in both lower abdominal quadrants and had been in bed most of the time; she had also had similar attacks of pain prior to operation. Entered with a temperature of 101.°, abdomen somewhat rigid, considerable tenderness in both lower quadrants: diagnosis, bi-lateral salpingitis. During observation there were remissions of temperature and improvement in general condition; but operation was indicated by persistent pelvic pain.

Operation.— Mesentery on right adherent to parietal peritoneum; uterus displaced to right; peritoneum from anterior face of broad ligament adherent over anterior face of uterus; intestines adherent to appendages; ovaries enlarged; distal ends of both tubes adherent to bottom of pelvis. Bi-lateral salpingo-oöphorectomy; right tubo-ovarian mass unruptured in removal; left ovary ruptured (pus later found to be sterile). Dense adhesion between intestine and lower posterior wall of uterus it was thought best not to attempt to separate. Gauze drain behind each broad ligament to control oozing from adhesions. Patient in fair condition during operation, and was not stimulated.

Convalescence. — On 2d day T. rose to 101.°, on 3d and 4th days ranged between 99.° and 101.°, and after that between 98.° and 99.° The pulse, which was of rather poor quality on leaving the table, ranged between 120 and 130 for two days, then dropped to 80 on the 5th day; quality at all times good after the first few hours. Wicks were changed on 3d, 5th, and 7th days, and were odorless; moderate amount of drainage. Bowels moved freely, except on 3d day. Urine negative, and passed in good amounts. Moderate abdominal pain during first few days; general condition steadily improved.

Patient was thus convalescing very satisfactorily, until after eight days, when she complained of epigastric pain; next morning pain continued, vomiting began. Pulse 90, of poor quality, temperature 98.°, respiration 25. Facies drawn, extremities cold. Patient failed rapidly in her general condition during the day; late in the afternoon the pulse became imperceptible at the wrist, temperature dropped to 95.°. Bowels did not move; but there had been three good movements the previous day. Vomiting constant and became stercoraceous. Patient died in early morning of the 10th day after operation.

Autopsy showed acute general peritonitis, caused, it seemed to me, by post-operative streptococcus infection through the drain.

25. Chronic Salpingitis and Oöphoritis.

M. C., 18, married, 1 para, had had for several months intermittent pain in right lower abdominal quadrant accompanied by a thick, greenish, vaginal discharge. Abdomen rigid, some voluntary spasm, tender over left lower quadrant. P. 100, T. 100.° Vestibule and introitus vaginæ present clinical appearance of gonococcus infection (organism not found). Cervix bi-laterally lacerated and everted; uterus retroverted and displaced to left; bi-lateral tubo-ovarian masses. Persistent pain during observation of over three weeks clearly indicated operation.

Operation. — Adhesions of mesentery to uterus and to anterior face of broad ligament, which latter was adherent to anterior face of uterus and to left appendages; intestinal adhesions to both appendages, dense in some places. Bi-lateral salpingo-oöphorectomy without spilling pus; a small portion of right tube could not be removed owing to dense adhesion to rectum. Considerable oozing from adhesions; abdomen closed with gauze drain behind each broad ligament; provisional suture at exit of drain.

Convalescence satisfactory until the 7th day. The wicks were started on 2d day; but there was so much oozing that they were not removed until the 5th day. On the 7th day there was considerable redness and tenderness about the upper part of the incision, and on the 9th day suppuration developed. The whole incision broke down and there was a sinus two inches deep, which was curetted. Patient was out of bed on the 41st day; uterus in normal position, broad ligaments empty, no tenderness or pain; abdominal incision has closed by granulation. Discharged well on 46th day.

26. Chronic Salpingitis, Cystic Ovaries.

M. N., 30, married, iii para, entered flowing, with severe pain in lower abdomen; vomiting for three days; chill the day before. Abdomen rigid, markedly tender in both lower quadrants. T. 102.° Leucocytes, 14,000. Uterus retroverted and fixed; tenderness and induration over both broad ligaments. General condition improved under observation of four weeks; but temperature fluctuated, and there was more or less pain in lower abdomen the greater part of the time.

Operation. — Intestinal adhesions easily separated except between distal end of right tube and rectum; a wide dense band between lower part of uterus and rectum it seemed best to let alone. Both ovaries large and cystic, both tubes curled round behind uterus and adherent. Bi-lateral salpingo-oöphorectomy without rupture; ventro-fixation of uterus, broad ligaments closed over with peritoneum, abdomen closed without drainage. Condition excellent throughout; good ether recovery without vomiting.

Convalescence. — Moderate amount of pain in lower abdomen; constant improvement in general condition. Highest T. 101.°, but not normal until after the 19th day. On the 5th, 6th, and 7th days there was considerable redness about the stitches along the lower half of the incision; breaking down of the wound was feared, but the scar cleared up under the frequent application of hot corrosive poultices. [Had this case been drained the sinus would very probably have been infected and the incision broken down.] Out of bed on the 25th day; uterus in apposition with anterior abdominal wall, nothing felt on either side, scar satisfactory. Discharged well on 27th day.

27. Chronic Salpingitis, Cystic Ovaries.

S. H., 40, married, iii para, entered with extreme pain in lower abdomen; spoke no English, and history was unsatisfactory. Abdomen rigid, diffusely tender especially over right lower quadrant; P. 100, T. 102.° Uterus pushed forward and fixed; a mass, to the right and behind, nearly filling the pelvis. Leucocytes, 10,700. Patient improved and became free from subjective symptoms; the pelvic mass increased in size. Operation advised, but refused; discharged, relieved, on the 12th day.

Re-entered two weeks later with recurrence of symptoms; leucocytes, 12,200; uterus more movable; mass somewhat smaller; pelvic pain persistent.

Operation. — Uterus somewhat larger than normal and covered with a fibrinous exudate in which were several small cysts. On right, a tubo-ovarian mass and a thin-walled cyst proceeding from fused tube and ovary; removed without rupture of cyst. On left, appendages adherent to uterus and rectum, fimbriated end fused with ovary forming a cyst 1½ inches in diameter. Part of the tube was removed; the cyst wall was so densely adherent to rectum that a good part of it was left in situ. On account of oozing from separated adhesions, abdomen was closed with gauze pack behind each broad ligament.

Convalescence. — Wicks were started on day after operation, and considerable bleeding ensued; wicks changed on 5th day, when considerable redness was observed about the wound. Incision broke down, purulent secretion in drain-sinus; for several days erysipelatous condition about wound; tissues bright red and indurated. It was two weeks before redness and induration began to disappear and the discharge to diminish; the sinus then began to close, and from this time convalescence was steady. Out of bed on 29th day; on 35th day abdominal scar satisfactory (sinus closed), uterus movable and in normal position, broad ligaments empty, no exudate felt in pelvis; discharged well.

Of these last four cases, in the infected ward, three were drained; one died of acute general peritonitis, two made complete and satisfactory recoveries, but with prolonged convalescence owing to suppuration of the abdominal incision. The case that was not drained recovered promptly, a threatening suppuration of the incision being averted by timely and vigorous antiseptic treatment.

Drainage is in some cases imperatively demanded. I think, in reviewing the above cases, that it was necessary in every case in which it was employed; but the danger in drained cases of post-operative infection must be clearly borne in mind, and the patient safeguarded by the most scrupulous attention to all the requirements of intelligent asepsis.

XI.

A NEW DILATOR FOR THE CERVIX UTERI.

By Frank A. Higgins, M.D.

The writer has for a long time felt the need of an efficient instrument for mechanical dilatation of the cervix in certain conditions in which rapid dilatation of the rigid cervix becomes necessary.

Nature has provided the best possible dilator for the cervix, when time is not an important factor, but nature's method is slow of action, and cannot be depended upon for rapid progress in emergency. The best substitute for nature when the element of time does not enter into the problem is undoubtedly the colpeurynter. This is a cone-shaped, inelastic bag, and is used more or less extensively as a dilator of the cervix when the membranes are already ruptured. It is also used to induce labor, and to promote contractions in uterine inertia. It often promotes strong uterine contractions, but otherwise it possesses no advantages as a dilator over the amniotic sac.

Deep cervical incisions, in place of mechanical dilatation, is a method recently advanced by Dührssen of Berlin, in whom it finds a very strenuous advocate. He is also a strong opponent of instrumental dilatation chiefly on the ground of the danger of deep tears, but his opinion cannot be considered altogether unprejudiced because of his evident desire to advance his own operation. Dührssen's method has not been practised to any great extent in this country or abroad, so far as I am aware, outside of his own immediate circle.

That there is a considerable legitimate need and demand for a mechanical dilator of the cervix in pregnancy and in labor is, I believe, plainly evident. This demand is attested by the various instruments which have already been devised for this purpose, although no one of these except the recent one of Bossi has ever met with much approval outside of the hands of its inventor.

Considerable of a controversy has recently been aroused, particularly in Germany, by the introduction of Bossi's dilator, which has had an extensive trial there and in England. Many men have used it successfully and without serious damage to the maternal soft parts. On the other hand, some men denounce it as a dangerous instrument, and declare that any form of instrumental dilatation of the cervix is an unsafe procedure. I have myself used the Bossi dilator in two cases of eclampsia demanding rapid delivery, and with the greatest success. Both cases were primiparæ, and in neither was there appreciable laceration. One required nineteen minutes and the other thirty minutes for complete dilatation.

Any contention over the use of methods or of instruments can be settled, I believe, in only one way, and that is by the results of the individual operator. If one finds that by adopting certain methods he obtains better results than by others, then that method is by all means the one for him to pursue. Other observers may get different results, and naturally make their deductions accordingly.

To the average man the operation which accomplishes the result in the easiest manner and with the least damage is the most satisfactory, and that operation, whether it be by hand or by instrument, is the one for him to adopt. There seems to be nowhere any hesitancy in the employment of forcible dilatation of the cervix, but it is altogether a question of how it shall be performed. I have no doubt that forcible instrumental dilatation of the cervix will in some cases, even in the most skilful hands, cause moderate laceration of the cervix, and very likely in unskilful hands occasionally deep tears. Why should this not be so with an instrument? We all know that it does frequently occur with dilatation by the hands, and that dilatation of the cervix without lacera-

tion is often impossible of attainment. Can any one describe any method of forcible dilatation which does not give rise to lacerations, or can any one point out any number of cases which have been dilated manually which do not show them?

The deepest laceration I have ever seen, one extending deep into the broad ligament, has reeently been under my care for repair, after manual dilatation at the hands of a man who opposes the use of the instrument. I have also known of at least two cases of rupture of the uterus from manual dilatation. Even cases in which the delivery is entirely taken care of by nature show deep lacerations. What gynecologist has not seen many deep bilateral lacerations in women who have had absolutely normal labors? Dr. Williams, Professor of Obstetrics at Johns Hopkins, in a recent article reports two cases of his own in which fatal rupture of the uterus occurred after manual dilatation. There always is, and probably always will be, more or less danger of lacerations in any form of artificial dilatation of the cervix for rapid delivery, no matter whether this is done manually or by instruments. It is practically impossible, in my experience, to dilate a primiparous cervix completely by hand and do a rapid delivery, without causing lacerations of the cervix. Undoubtedly the colpeurynter does this better and with less injury than any other method, but even this is not free from objections on this score.

The danger of tearing the tissues is, I believe, not as great with the metal dilators, if they are used properly and carefully, as it is with the hand attempting to force itself into the closed cervix. With manual dilatation, it is often not a question of merely causing tears, but so rigid is the cervix that it becomes largely a question of being able to apply sufficient force to get the os open in some way, and of pushing the hand through regardless of the integrity of the cervix. In many cases where the hand is the agent for dilatation the cervix yields only by tearing.

With the mechanical dilator the force expended can be accurately gauged and uniform power and pressure applied to the cervix, and by keeping the tissues constantly on moderate tension, letting up a little occasionally to observe its

effect upon the cervix, the tissues are stretched and give better than by such jerky and irreguar force as may be applied under manual dilatation.

I do not wish it to be thought that I believe that manual dilatation of the cervix is to be superseded by instrumental dilatation or even that its field is wider than that of the former. Manual dilatation of the cervix in labor is a procedure of great usefulness, and is considered by many men to be the only safe method and is the only method used by them. In cases of soft multiparous cervices, in the presence of old tears, and in placenta prævia, I believe that manual dilatation is usually much better than any form of instrumental dilatation. Indeed, in these cases it is my opinion that instrumental dilatation is generally contra-indicated, excepting only certain instances where dilatation of the cervix may be done by some form of the colpeurynter. Instrumental dilatation is best done directly under the eye of the operator who can see and observe the cervix as it dilates and also the extent of each tear as it occurs. With a tear thus easily located, it is a very simple matter as I have found to put one or two stitches into the torn edges, although this is rarely necessary.

Granted that instumental dilatation is permissible in certain cases, I believe it needs no demonstration that a dilator for a pregnant uterus to be efficient must exercise lateral pressure against the inner surface of the cervix. The insertion or pushing of conical shaped bodies into the cervical canal suffices for slight degrees of dilatation for curettage, but for a delivery of a fetus, sufficient dilatation cannot be accomplished in that way.

The hand is virtually an instrument of the cone type, and whatever method of manual dilatation is employed, the force is essentially that of a cone or wedge. The methods of Drs. Edgar and Harris overcome that to a certain degree, but are not applicable to all cases nor is complete dilatation accomplished by these alone.

Bossi of Genoa several years ago brought out his mechanical dilator, although it is only within a year or two that it has attracted much notice. It has proved so far the most

efficient instrument yet put before the medical public for rapid dilatation of the cervix. The instrument is of metal with four arms made to expand by means of a series of levers controlled by a single screw. The instrument is undoubtedly a powerful one, and able with the exercise of considerable force to accomplish the object for which it was designed. The chief criticism to be made of the instrument is that its mechanism is very complicated and it is so put together with it numerous parts, many levers and screws, that it is practically impossible to take it apart for cleaning. This feature renders strict asepsis impossible and is of course a *sine qua non* in any surgical instrument at the present time. The instrument being of metal may be boiled, but its many slots and crevices will harbor surgical dirt, so that in a very short time mere boiling would be insufficient. It is surprising that this very objectionable feature of the instrument has not elicited criticism before.

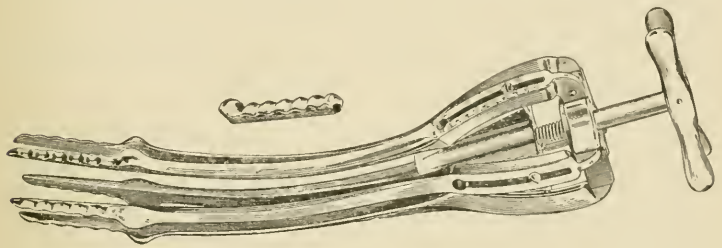
In my opinion the best feature of Bossi's instrument is that of the removable metal tips, which have been adopted by others, myself included. These admit of an instrument with a small point for use at the beginning of dilatation, while as the os becomes larger and the tips are applied, the pressure is distributed over a broader space so that there is less liability of cutting or trearing the tissues.

Recognizing the need of a mechanical dilator for emergency use I have designed an instrument which I believe will ultimately be found to fulfil every purpose required in an instrument of this kind. It is a five-bladed instrument, the tips of which are made to spread by an advancing cone moved by a screw and a handle. The instrument is made in a thoroughly aseptic manner with a limited number of parts. Each part is easily detached for cleaning purposes and there is no opportunity for the instrument to harbor surgical dirt.

The instrument was first designed for six arms, but I believe five is a better number, for the reason that the pressure is better distributed in five than in six points, no two arms coming directly opposite one another and therefore there is less danger from lacerations laterally, where they almost always occur.

Instrumental dilatation is best performed with the patient turned across the bed or on a table, in the lithotomy position. A weighted perineum retractor or a broad Simm's speculum is used, the anterior lip of the cervix being seized by a double hook and brought into view. The instrument is then inserted without the broad metal tips and dilatation carried to about three centimeters, when the instrument is removed, the tips applied and dilatation completed with them in place. The dilatation should be completed to about four inches by the scale in order to allow sufficient room for the fetal head. A scale in centimeters and inches indicates the amount of dilatation.

The use of the instrument gives one the greatest feeling of security, because of the comparative ease with which the work is accomplished directly under the eye of the operator, where the speed may be increased or diminished according to the



readiness with which the cervix stretches. A moderate sized Hanks dilator is sometimes necessary to start the dilatation before the cervix will admit the tips of the instrument, but this is rare in pregnancy. The unopened os can be fully dilated in from twenty to thirty minutes. With the instrument it is not so much a question of how fast the os may be dilated, but on the contrary it is altogether a question of how fast the cervix will admit of being stretched, and only so fast should the dilating arms be expanded.

The use of the instrument is indicated mainly when rapid delivery is necessary and chiefly in eclampsia. It should be used only with a rigid cervix. The dilator is also an excellent instrument for the induction of abortion or labor, acting with greater quickness and certainty than any method involving the introduction of a foreign body into the uterus.

It will excite contractions in the presence of uterine inertia, and sometimes even when the patient is anæsthetized.

In deciding upon the propriety of the use of an instrument for rapid dilatation of the cervix, one does not have to answer only the question, whether or not instrumental dilatation causes lacerations of the cervix. We know that manual dilatation of the cervix frequently does produce extensive lacerations. The question at issue then is, whether the instrument will generally produce more extensive lacerations than manual dilatation does. This question cannot be answered at once, but so far, the writer's experience leads him to believe that it does not. In any event many cases are so difficult of dilatation that the instrument becomes practically a necessity and is a great boon to the operator.

This instrument was devised particularly for use in difficult dilatation in connection with the termination of pregnancy in emergency work. For a number of months, however, the writer has been using his dilator for all purposes of cervix dilatation, and it has been found very efficient for dilatation before curettage.

With it wider dilatation of the nulliparous cervix can be secured than by any other method, so that in certain cases where it may seem advisable, sufficient dilatation may be obtained to introduce the finger and explore the cavity of the uterus.

The instrument is manufactured by the Kny-Scheerer Company of New York, and Codman & Shurtleff of Boston.

XII.

A NEW METHOD OF CLOSING THE ABDOMEN AFTER LAPAROTOMY.

By Frank A. Higgins, M.D.

According to our present customs the ideal closure of the abdominal wall after laparotomy would seem to be attained by a method of careful approximation and suture of each individual layer by fine, absorbable, and perfectly sterilizable suture material, which could be inserted without the necessity of tying knots, and without the necessity of perforating the skin by sutures. The ideal method of closure would also obliterate all so-called dead spaces and be able to prevent all fluid accumulations within the layers.

Skin sutures, knots, permanent suture material of all kinds, absorbable sutures which cannot always be perfectly sterilized, and dead spaces allowing fluid accumulation within the layers of the abdominal wall, are the chief difficulties, aside from septic material introduced at the operation, which interfere with obtaining perfect results, and are the questions which confront one in attempting to decide the best way in which to perform the work.

Many methods have been proposed and used for the closure of the abdominal wound — so many, in fact, that it would seem almost impossible to devise another possessing merit. This is very likely so, but still it is not probable that the last word has been said on this any more than on any other subject connected with surgery. New methods will undoubtedly be evolved in the future, and very probably new materials for suture superior to anything we know of at present. With some of the present methods of suture of

the abdominal wall the results, both temporary and permanent, are almost ideal in many of the cases. It seems evident, then, that any further advance must be directed towards the improvement of the technic and to the devotion of more careful attention to details.

There are practically only two methods of abdominal suture, the mass or through-and-through suture and the layer or tire suture, all others being essentially modifications of one or the other of these two. Each method has its advocates, but the superiority of the layer method in most cases is becoming generally evident to surgeons and writers. It is not my intention to review or discuss at length the question of the different methods of closure of the abdominal wall after operation, or to argue for or against any particular method, any more than may be necessary to point out and demonstrate the feasability and advantages of the modification which I suggest.

The layer suture is generally regarded as the nearest approach which we can attain to the natural conditions exisiting before operation. This, with some combination of the mass suture, probably offers the strongest barrier possible to hernia and to infection through accumulation of fluid within the walls, and this modification has been adopted as a satisfactory compromise by a number of surgeons. The tier suture is chiefly objected to because of the danger of the so-called dead spaces and the time necessary for its use. The extra time is not usually an important factor, as the anesthetic may generally be omitted as soon as the peritoneal suture is begun, and the whole wound is commonly closed before the patient makes any disturbing efforts to move. In the comparatively few cases in which the shock is a vital element then technic has to be abandoned and every attention given to rapidity, and the mass suture becomes necessary.

The second objection raised against the layer suture is that it leaves at least two dead spaces, and under these circumstances a wound is likely to become filled with blood. The longer the wound the greater this danger. That there is greater liability of infection taking place when dead spaces

are present is also generally admitted. These objections are undoubtedly important ones.

Of course if any source for septic infection has been introduced or left in the abdominal wall, the exercise of pressure by the mass suture will not eliminate it. Yet the abscess in the abdominal wall generally arises from the infection of fluid accumulations of blood and lymph, by the less virulent forms of bacteria from the skin. If these fluid accumulations are prevented, the bacteria, present only in limited quantities, do not find the most favorable soil for development and are usually eliminated without giving rise to trouble.

Permanent suture material in the abdominal wall seems in general to be undesirable because so many cases have occurred in which it has caused irritation and eventually required removal. Probably the constant strain and tension on the abdominal wall and the frequent contraction of the abdominal muscles have more or less to do with the irritation caused by permanent foreign material in this particular part of the body.

Sutures of absorbable animal material such as catgut, of the sterilization of which we can never be perfectly sure, are never used by many men, but the choice for the present at least must lie between this and non-absorbable sutures. I have always used fine catgut, and have never had bad results which could be attributed directly to it, and therefore I shall probably continue its use until some more favorable absorbable suture is developed.

The objections to sutures passed through the skin are well known. They arise from the cutting and irritation which they cause and from the presence of the skin micrococci. If the sutures are passed from within outwards and the metal guard I propose is used, these difficulties become practically nil.

Knots, which are often of considerable size to be secure against untying, seem to me to be occasionally a source of irritation in the abdominal wall. This occurs especially in thin patients and at the lower end of the incision where the

fascial suture is tied and the knot becomes practically subcutaneous. Occasionally as late as two or three weeks after operation a wound will open a little at this point without suppuration after primary union has apparently taken place. This is not a serious condition, but it is annoying, and is often rather slow in healing. I know of no way of accounting for it except on the theory that the knot in the fascial suture, which is just beneath the skin in these cases, causes irritation. The method recently proposed of suturing the fascia with a removable silkworm gut suture might obviate this difficulty. I have not used this method, because this suture must be removed within two weeks, and it seems desirable to me to have a suture in the fascia which will remain about three weeks.

There are three important considerations to be kept constantly in mind in every operation, abdominal or otherwise. These are, first, the preservation of the life of the patient; second, the securing of results tending to the improvement of the patient's condition; and, third, the after results and the appearance of the patient.

With the first two conditions this paper is not concerned. Under the third arise several conditions which we may consider. The frequency of ventral hernia has been greatly diminished by the layer suture, by the avoidance of drainage, and by the securing of aseptic healing of the wound. Hernia may occur also as a direct result of fluid accumulation within the abdominal wall, causing fistulous openings and ending in secondary suppuration. The importance of the prevention of fluid accumulations in the abdominal wall has been repeatedly pointed out. It has been authoritatively stated that "nothing is more conducive to primary healing of wounds than the absolute avoidance of all oozing or accumulations of blood, which may become infected and give rise to suppuration after the wound is closed."

A judicious combination of the mass and tier suture methods of closing the abdominal wall undoubtedly overcomes the most serious disadvantages of either method used alone. The through-and-through suture itself, as used at present,

has never proved very satisfactory as I have seen it used by others or in my own work. Trouble frequently arises from the fact that these sutures have to be tied tightly in order to bring the layers and the skin together. After the first few days these stitches begin to cause considerable redness around the sutures where they penetrate the skin; and where they cross the wound they cut through the skin and not infrequently give rise to suppuration and to stitch abscesses. Further infection ensues unless at this time the irritating sutures are cut and removed, and then a weak corrosive dressing is necessary to check the inflammation just starting up. These through-and-through sutures of silkworm gut, which are almost sure to cut through the skin more or less as described, give rise to additional scars on the abdomen, which later are often seen as welts from one-quarter to one-half inch in length running at right angles to the direction of the wound. The early removal of these through-and-through sutures is apt to end in some separation of the edges of the wound, entailing delayed union and a wider scar.

Some surgeons deny that the appearance of the wound after healing is of any importance, and do not take into consideration at all the looks of the resulting scar. If the functional result is good that is all that is necessary, claiming that whatever the appearance of the scar may be, it does not matter to the patient. I believe that this is true to a certain extent with a certain number of patients. With other patients I have found that the idea of having any abdominal scar is very objectionable, and of such importance does it appear to them that they will not consent to have any abdominal operation performed except under urgent indications. I have known operations put off for this reason only, even when there has been actual pelvic pain. It is also true that many patients do not inquire or think about these things in connection with an operation. I have also heard patients criticise the work done at certain hospitals and by certain surgeons because some friend who had been operated upon by another man had a narrower and shorter scar.

This may be a comparatively small matter which the older surgeon with a widely established reputation does not need to consider in his work. Very likely also he does not have to answer the questions that are propounded to the younger man, and, moreover, his results are more likely to be taken without question than are those of the young surgeon. Very small incidents are often known to exert great influence, in matters of much importance, for the good or for the detriment of a man. Especially is this apt to be true at the beginning of a man's career. I believe that at all times the abdomen after operation should be left in as good a condition as possible with regard to both strength and looks, and that in the long run, other things being equal, the man who does this and who pays careful attention to details will be the more successful and obtain the best results.

The question then arises: how can the factors which prevent the rapid and uncomplicated healing of the abdominal wound best be prevented? In the writer's opinion, by the use of the tier suture in combination with the mass suture, by the introduction of mass sutures in such a manner that they cannot irritate and cut through the skin, and by the exercise of suitable counter-pressure along the whole length of the incision in the abdominal wall. Dead spaces have not heretofore been thoroughly overcome by the mass suture unless these sutures are put in much closer than has been customary in the writer's observation. As used, however, they have sufficed for all practical purposes in the great majority of cases.

Some two years ago the writer, who has always believed in the tier suture, became convinced of its disadvantages from the results in some cases of his own, and attempted to overcome the possibility of fluid accumulations in the abdominal walls by a modification of the mass suture. This modification had never been tried elsewhere so far as I am aware; at least, though I have not made an extensive search of the literature, I had never seen it suggested. It consisted in passing several mass sutures of fine catgut — No. 1 chromicized preferably because of its strength and lasting qualities — through the various layers of the abdomen, from the peri-

toneum outward to, but not, through the skin. This constituted a buried mass suture of absorbable material, which included all the structures in the abdominal wall except the skin. The peritoneum and fascia were sutured with running catgut suture before these mass sutures were tied. After these were tied the skin was sutured in the usual way.

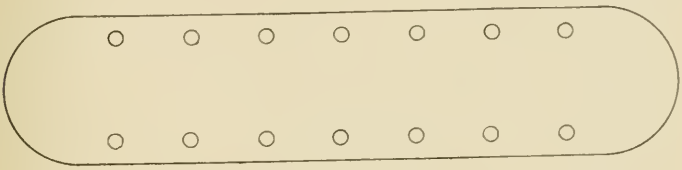


Fig. 1.

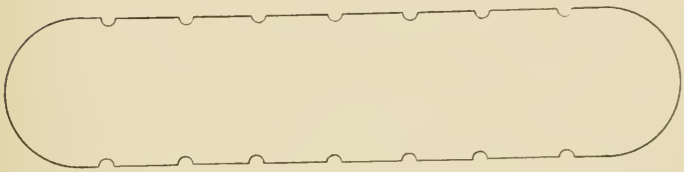


Fig. 2.

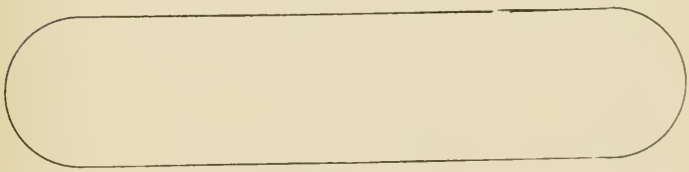


Fig. 3.

This method was abandoned, although no trouble whatsoever was experienced from its use in the few cases in which it was tried. The chief reasons why this method of introducing the mass sutures was given up were that the knots in the mass sutures came just beneath the surface of the skin, and I feared would in many cases cause sufficient irritation

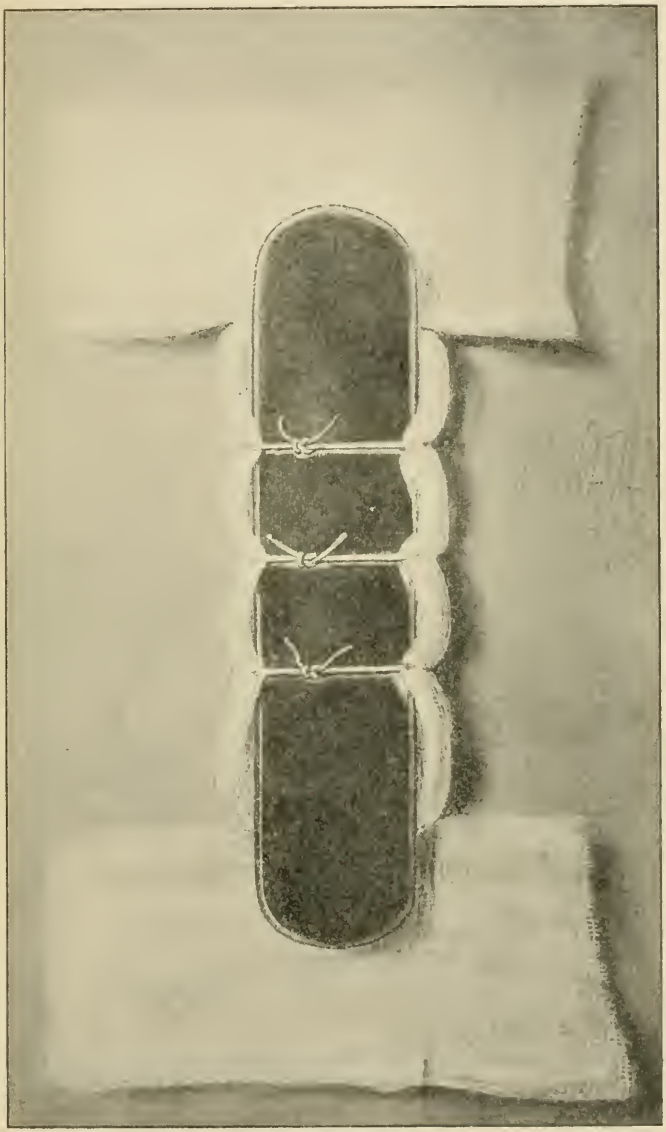
to interfere with union. In addition, I did not like the idea of leaving any more suture material than was absolutely necessary to be absorbed by the tissues in the abdominal wall. This modification possessed the attractive feature of having absolutely no penetrating sutures in the skin, provided the subcuticular suture was used; but its disadvantages seemed to outweigh its good points.

More recently I have again been devoting considerable attention to the subject of the abdominal suture and the obliteration of dead spaces, which I believe it is unwise to neglect. The mass suture as at present generally used is unsatisfactory, because it cuts through the skin and gives rise to redness, to irritation and to scars. It frequently results in stitch abscesses, and on this account often has to be removed before the union has become firm.

Granted that the mass sutures are necessary, it has always seemed to me that the desideratum is proper and effective counter-pressure against these sutures. The idea of a narrow metal plate with perforations, as shown in Figure 1, first occurred to me. This plate in actual practice was abandoned because it was found that, unless the sutures were put in with considerable care and at the expenditure of more time than was desirable, they were not likely to come opposite the perforations in the plate. The same metal plate with serrations in the edges, as shown in Figure 2, was also abandoned for much the same reasons. In using this plate, however, it was found that it did not matter where, along its edges, the sutures were tied. They held equally well wherever placed, and there was no opportunity for the plate to slip either way. Consequently the metal strip with straight parallel edges, Figure 3, has since been used. The plate is a strip of thin, nickel-plated copper about one-thirtieth of an inch thick. It is stiff enough not to be bent by the sutures, but is easily bent by the fingers in case it needs to be adjusted to any inequalities in the surface of the abdomen.

I will state briefly the method by which it seems to me best to close the abdominal wound after laparotomy. The mass sutures of silkworm gut are introduced by double-

threaded large curved needles. One suture is placed at either end of the wound, and one or more between, depending upon



the length of the wound, fewer being needed than without the metal guard. The ends of these mass sutures are clamped and held on either side by heavy clamps, which by

their weight hold the sutures tight and prevent any danger of the intestine or omentum slipping beneath them. The peritoneum and fascia are then closed by a running suture of fine chromicized catgut, and the skin with a subcuticular suture of fine silkworm gut or horse hair. The mass sutures are finally tied over the metal guard, which is separated from the abdominal wall by a pad of folded sterile gauze. A small pad of gauze wrung out in a weak corrosive solution is inserted under either end of the guard, and is folded over its ends, completely enclosing the wound in an effective and immovable antiseptic dressing. This acts effectually as a barrier to any outside infection, while nothing but sterile gauze comes in contact with the surface of the wound. Figure 4 shows the metal guard in place, with the mass sutures tied and the antiseptic gauze at the top and bottom ready to fold over. The outer dressing need then be only a comparatively small one. Usually on the fifth day after operation the first dressing is done, and the mass sutures, having performed their function, are cut. They are not removed till the day following. Subsequent dressings are repeated every second or third day, and the subcuticular skin suture is removed in from ten to fourteen days. The mass sutures, having merely perforated the skin for a short time, leave no permanent scar.

The through-and-through sutures should not be tied under more tension than one would use without the metal guard. In this way the circulation is not interfered with, the vitality of the tissues is not lowered, and there is no cutting through of the sutures, at least on the surface. The gauze beneath the metal guard is of advantage in that it relieves the skin from direct pressure of the metal, and that it absorbs the slight amount of blood from the skin and whatever may be expressed by the counter-pressure. In addition, the metal guard holds the dressing absolutely in place without adhesive straps, and consequently no outside source of infection can reach the wound until after its first dressing. At this time the wound should be sufficiently well united to insure it against infection under ordinary conditions.

This modification which I propose and have now used for a number of months with great improvement in my results, may at first appear unnecessary and cumbersome, but in actual practice it does seem to possess decided advantages. In the first place it in no way interferes with the perfect and aseptic healing of the wound. It eliminates the chief objections to the layer suture without increasing materially the time needed for closure. It effectually controls all oozing of blood and serum into the wound, so that it becomes rarely necessary to ligate any of the vessels. The accumulation of all collections of blood within the layers of the abdominal wall is thereby prevented. Stitch and other forms of abscesses become practically eliminated.

With its use several advantages in its favor have appeared which were not apparent or expected at its conception. One is that the pressure of the metal guard promotes adhesion between the layers in the abdominal wall, and a distinct non-inflammatory induration may be felt running along on either side parallel with the edges of the wound. This, I believe, tends to the formation of a firmer and stronger cicatrix than any other method yet proposed. It also tends to prevent stretching apart of the edges of the skin, and results in a linear scar.

The writer, in conclusion, would say that he does not so much regard this as a new method of abdominal suture, as he does that it is another step in the technic of the closure of the abdominal wound, and one by which many of the disadvantages of the layer and the mass sutures may be overcome. It requires very little extra time for its application, it promotes union, and it gives additional strength and improved appearance to the abdominal wall. I do not expect its advantages to be appreciated without a trial, but I do believe, from my own experience, that after a fair trial others will be convinced that it has certain advantages in many cases.

Since this paper was begun the writer has been trying, in place of the metal shield, transparent plates of celluloid or pyrolin. With plates of this material, pads of sterile gauze

are placed alongside either edge of the wound, but do not press directly upon the surface of the wound itself. Glass plates might be used in the same way.

This method possesses the attractive feature that the outer dressing may be removed daily if desired, and the healing observed without being obliged to disturb or dress the wound. The writer would merely mention this latter device as a suggestion here. He does not intend at the present time to advocate its permanent use without more extended trial.

XIII.

REPRODUCTION OF THE TIBIA.

By Abner Post, M. D.

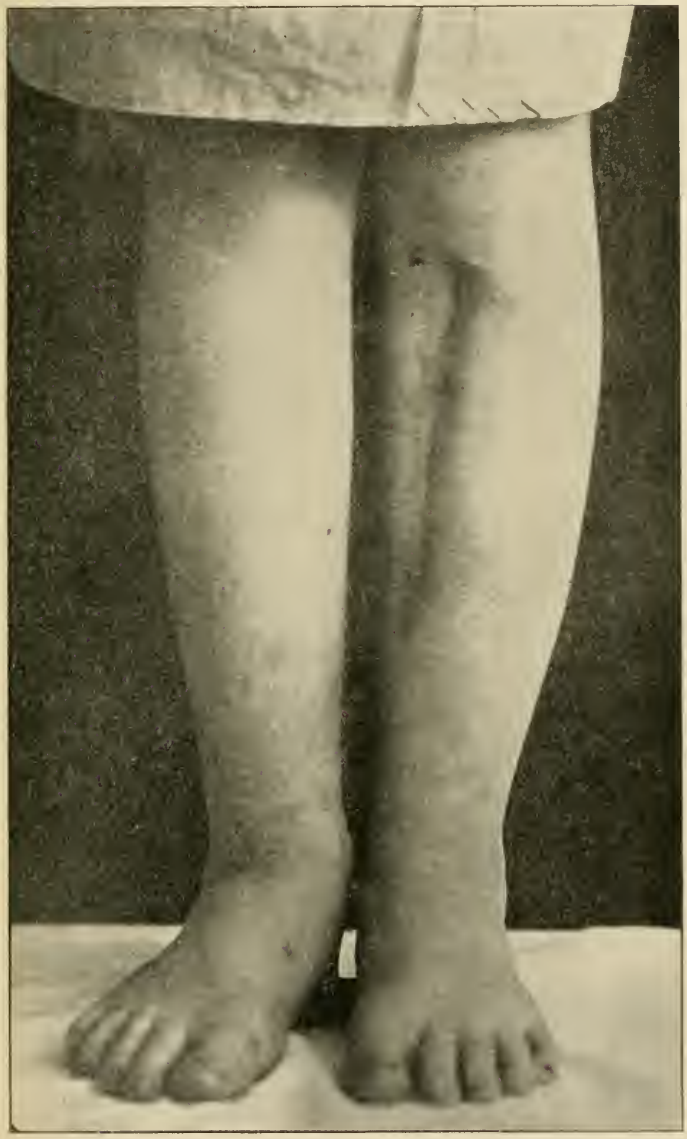
This little patient, Mary B., was admitted to the Contagious Department of the Hospital in March, 1902, with measles and with a story of a broken leg. Soon after her entrance her leg became swollen and extremely painful, and her general condition became serious. The condition of the leg pointed to an osteomyelitis, and an attempt was made to relieve the condition by an incision. The relief was temporary. The measles were serious, but the leg was evidently the cause of her most severe symptoms. At this point I was asked to see her. It was judged necessary to interfere to save her life, but she was in no condition to survive a long operation or much loss of blood. The operation was done with the leg raised higher than her head. With a gouge and a sharp curette it was possible to remove a large portion of the tibia. This material was thoroughly infiltrated with pus. The idea of the operation was to remove enough of the diseased bone to relieve the tension, but to do it all in the shortest possible time and with the least possible loss of blood. The preservation of life was the first object; the ultimate result as to the leg was of less immediate consequence.

She rallied from the operation and slowly convalesced. At the end of three months, on June 26, she was transferred to the main hospital. The wound over the tibia was discharging quite freely. She suffered a good deal of pain at times, and her temperature varied from normal to 104°. On July 23 a

final operation was done. A fresh focus of diseased bone was found at each extremity of the original operation. The curette penetrated so close to the knee joint that the utmost care was exercised to prevent entering the joint. At the lower end of the tibia an area of diseased bone was found

which seemed entirely separate from the rest, but a little chiseling disclosed a narrow passage connecting the two portions of disease. There was complete separation at the seat of the original fracture near the upper end of the bone. There was abundant new bone attached to the periosteum. The cavity was carefully cleaned with salt solution, filled with iodoform gauze and then covered with sterile gauze, and the

leg placed upon a wire splint. The first dressing was not done until August 1, when there was no evidence of suppuration.



Later there was some discharge, especially from the lower end of the wound, and it looked as if some further inter-

ference might be necessary, but the alarm proved groundless. In November she went through a moderately severe tonsillitis, which justified a search for the Klebs-Lœffler bacillus, but fortunately none were found. In the middle of December she was beginning to bear some weight on the leg. In January she was discharged walking with crutches. She has since visited the Hospital, walking without support and with the wound perfectly healed. There is a very slight tendency to inversion, but not enough to interfere with walking. This slight inversion is well shown in the cut on page 117.

XIV.

A CALCULUS OF UNUSUAL DIMENSIONS.

By Abner Post, M.D.

The man who carried this stone was 66 years old. He dated the beginning of his troubles from a urethral hæmorrhage which he believed occurred 14 years ago. Since that time he has had almost constant discomfort and frequent micturition. For some time he has been up every hour in the night to pass water, and his bed was also wet from a flow which he could not control. Sometimes his water refused to come, when he would start it by raising one leg.

I saw him first in July, 1902, when he was passing water every few minutes. There was dullness over the pubes. His urine was foul. He came to my office with some difficulty, standing in the electric car hanging by the straps and bearing much of his weight on his arms.

Under the administration of urotropine the urine lost most of its foul odor and his discomfort was less acute, but the symptoms changed very little.

I did not see him again until September when I attempted to pass a flexible catheter but without success. In October I passed a small elastic bougie and felt a stone. In November a small catheter entered the bladder, drew about an ounce of foul urine and was tightly held. No more urine could be obtained but the dullness above the pubes was unchanged.

The patient was very uncomfortable. It was evident that he had a stone, and that an operation was necessary to relieve him. Some unusual condition was recognized, but not the exact condition. It was not until February that he

made up his mind that life was impossible under existing conditions.

His first proposition was that I should operate in my office and let him go home. Then that the operation should be done in the room which he occupied in a house apart from his friends, and when he entered the hospital it was with the promise that I should operate the day following his admission.

When the patient was etherized and on the table it was found impossible to properly enter the catheter and wash out the bladder. It was not easy to say just why this manœuvre could not be carried out. The dullness above the pubes was still present. No further time was wasted in an attempt which had proved futile both with and without ether. The ordinary suprapubic incision was made and the bladder exposed and incised. The knife came directly down upon a hard substance and no water escaped. Separating the edges the calculus came into view, filling the entire bladder cavity. In order to expose it an incision was made as long as possible in the axis of the body. The stone seemed immovably fixed. The fingers of an assistant in the rectum raised beautifully bladder and stone together, but it was no easier to remove it from its bed. The finger passed about it showed that it was firmly adherent over much of its surface and largely near the urethral orifice to the bladder wall, while its end filled the urethral outlet. The catheter had apparently been arrested by these adhesions. Even when freed in great measure from these adhesions it was too large to find exit through the space obtained by the incision already made. To gain sufficient room it was necessary to divide the recti muscles and to make a transverse incision in the bladder wall on each side, so that the incision in the bladder was a crucial one. It was still wedged in so closely that several attempts were made before it was finally raised from its bed. Even then the bladder wall beneath the pubes was somewhat torn. The bladder incisions were then united by sutures with the exception of space for a rubber drain. An additional drain was put in through the urethra and the external parts united except space for the drainage. The hospital records say that the operation was finished in half an hour.

The operation was rendered more difficult by the inadequacy of any stone forceps to grasp a stone of that size. A constant stream, such as Dr. Young has described in his prostatic cases, was used in the after treatment. There was constant vomiting; the bowels became distended; he was so restless that the supra pubic drain was removed, the secretion of urine was small, and he died on the fifth day.

The plate shows the stone on the same plate with a pocket rule — and also the largest size Bigelow lithotrite opened to its fullest extent.

There was no autopsy.

The stone weighed 660 grammes.

Eleven and three-quarters inches in longest circumference and $10\frac{3}{8}$ inches in the other.

BOSTON, MASS., May 11, 1903.

Dr. ABNER POST, No. 16 Newbury street, Boston, Mass.:

DEAR DOCTOR, — I have completed my analysis of a portion of the outer part of the large calculus which you sent to me. It consists chiefly of phosphate of calcium and triple phosphate, with some carbonate of calcium and organized debris.

Very sincerely yours,

EDWARD S. WOOD.

The following extract from Coulson on the bladder and prostate is of interest.

The largest vesical calculus on record is said to have been in the possession of the French lithotomist, Morand. It weighed 6 pounds 3 ounces. An enormons stone weighing 51 ounces was long preserved in the hospital of La Charité, Paris. It was extracted after death from the bladder of a poor curate, who died in that hospital in the year 1690.

The largest calculus preserved in our collections is the one which Mr. Cline attempted to extract from the bladder of Sir William O'Gilvie; it weighed 44 ounces, and it was 16 inches round one axis by 14 round the other. Numerous cases are recorded where the stone weighed from 5 to 15 or 20 ounces; but how small a proportion they bear to the mass of cases operated on may be gathered from the fact that of the 703 calculi in the Norwich collection, weighed by Mr. Crosse, only two exceed 6 ounces in weight, and they were between 6 and 7 ounces.

XV.

HYPERNEPHROMA.

By Paul Thorndike, M.D., and John H. Cunningham, Jr., M.D., formerly House Surgeon, Boston City Hospital.

At the present time pathologists are forced to classify a certain class of renal tumors from a genetic as well as from a simply morphological point of view. The first steps in this direction resulted from the work of Grawitz (1883), who described a group of tumors (which had up to that time been classed most usually as renal lipomata) as "strumæ lipomatodes aberatæ renis," and claimed for them a suprarenal origin. In the years immediately following, and in fact up to the present time, other writers have claimed a renal origin for these tumors, some asserting that they arise from the epithelium of renal tubules, while others claim the endothelium of the perivascular lymph spaces as their starting point. It has, however, seemed clear to all that these growths cannot be collected into any one morphological group, and are by no means to be classified simply as sarcomata, carcinomata, or adenomata. They have, during the last few years, received the name of hypernephroma, the term signifying any tumor having its origin from adrenal cells, whether the growth be adenoma, carcinoma, or sarcoma in type. This term seems a peculiarly fortunate one at this stage of our knowledge, as it definitely indicates the adrenal and not the renal origin of the growths in question, and yet makes no claim for any purely histological basis of classification, and commits us to no one of the many points of view still held by histologists regarding such growths. At the present time the proofs of the existence of this class of growths and of the propriety of using this name for them are about as follows:

1. The situation of the growth just beneath the kidney capsule — the most common seat of aberrant suprarenal tissue.

2. The similarity of malignant tumors of the adrenal gland and these malignant growths of aberrant suprarenal origin.

3. The absence of any transition structure between the growth and the renal tissues surrounding it.

4. The tendency of the tumor to extend along and to involve venous rather than lymphatic channels.

5. The resemblance of the tumor cells to those of the suprarenal cortex.

6. The presence of fat drops and glycogen in the protoplasm of the cells — substances which are by no means universally or even commonly found in the adrenal tissues, and yet which are always present in tumors of this gland so far as they are known.

7. The property of the nucleolus of staining differently from the nucleus, a fact rarely if ever observed in cells of renal adenomata.

8. The presence of giant cells like those in the small hyperplastic growths of the suprarenal gland of which we have a knowledge.

9. The existence of an abundant capillary network as seen in the suprarenal cortex.

10. The presence of lecithin in amounts closely approximating those characteristic of suprarenal tissue.

The proper classification of hypernephromata will doubtless depend upon a combination of histological and genetic methods, and recent work upon glycogen and lecithin indicates that some progress will be made along chemical lines. It also seems proper to tabulate what few clinical facts we can already offer from the cases already described by Grawitz and his followers since 1883. These facts are briefly as follows:

1. The tumor occurs most frequently in the adult male.

2. It is usually large and has a nodular surface.

3. It is entirely within the kidney substance, or it is partially subcapsular.

4. The function of the kidney which contains it, is interfered with either by destruction of renal substance or by its compression from the tumor mass, or by both these factors acting together.

5. The tumor grows rapidly, is usually malignant, but may probably be benign in some instances.

6. It usually involves the renal vein and sometimes the vena cava, and metastases are formed along the blood current, especially in the lungs, liver, and bones, but do not involve the lymphatic channels.

Of the three cases which are here described, one occurred on the service of Dr. F. S. Watson, to whose kindness the writers are indebted for its use in this paper. They are also indebted to Dr. W. F. Whitney, of the Harvard Medical School, and to Drs. F. B. Mallory and E. E. Southard, of the Pathological Department of the Boston City Hospital, for assistance in the preparation of the material for illustrations.

Case 1. — Man, 48 years old, entered the service of Dr. Paul Thorndike, January 21, 1903. Family history good, except for one sister, who had a cervical adenitis. Thirty-five years ago patient had typhoid, and, four years ago, lead poisoning. Eight years ago, had an attack of pain in the right kidney, and thinks he passed a small calculus at that time. Three years ago he began to notice blood in his urine. Bleeding was almost constant for six months, but occasionally disappeared for one or two days, and, coincident with the disappearance of the hæmaturia, he usually developed considerable pain in his right lumbar region, which was relieved by the reappearance of the blood in the urine. At the end of this six months he had more bleeding than usual for one week, and then the blood disappeared and the urine became clear. During the next six months he had attacks of hæmaturia occurring every one to two weeks and lasting about twenty-four hours. Between these attacks he had considerable pain of a dull, aching character in the right kidney region This renal pain was relieved by the reappearance of hæmaturia, coincident with which the patient developed a pain referred to the corona glandis. He thinks that he passed clotted blood occasionally. At this time he was beginning to lose strength, gave up his work, but, as the hæmaturia subsided temporarily, no operation was performed. He continued his mild attacks of hæmaturia until May, 1901, when he had a severe attack lasting one week. This hæmaturia continued periodically until two months before entrance to the Hospital, at which time the blood disappeared entirely from the urine. One week before entrance he again began to pass blood, and noticed a long clot of small diameter

just before entering the Hospital. At this time the tumor was discovered, and the patient advised to come to the Hospital for operation. During the three years he lost about fifty pounds in weight and failed considerably in strength.

Physical examination at the time of entrance: Large, well developed man, emaciated and anæmic. Pulses equal, regular, and of fair volume and tension; rate, 100. Temperature, 99.6. Heart area normal, action regular, sounds not strong, but clear. Soft systolic murmur at apex not transmitted. Lungs normal. Extremities and reflexes normal. Abdomen symmetrical, full, lax and tympanitic, except in the right hypochondrium, where there is dullness continuous with that of the liver, the upper border of which begins at the fourth intercostal space and extends 9 cm. below the costal margin in the mammary line. Palpation reveals a hard, nodular, slightly tender mass which does not pulsate, but descends with deep inspiration. The lower border is ovoid in shape, with the convexity downward. Urine at entrance bloody, alkaline, specific gravity 1,026; urea, 30 grams; albumin, a very slight trace. Much normal and abnormal blood and a few large squamous, epithelial cells. White count: 6,500. Hæmoglobin, 60 per cent.

The blood in the urine disappeared the day after entrance. Twenty-four hours' amount for the three days following entrance varied between fourteen and twenty-one ounces. Temperature gradually climbed to 101.2 without apparent cause or change in the patient's condition. Urea remained at 30 grams. Operation on the fourth day after entrance; Dr. Paul Thorndike. Incision was six inches long, beginning just below the costal margin in the mammary line and extending downward over the tumor mass. Tumor was found covered with a network of large dilated vessels. Tumor region packed off from the general cavity and the peritoneum over the mass divided and clamped. The tumor, which was firmly bound by adhesions to the surrounding tissues, was freed and delivered. The mass continued down along the renal vessels and ureter. These were clamped en masse and the tumor removed. The ureter, which was much thickened by infiltrated new growth, was isolated and tied four inches from its upper end. The vessels were transfixed and tied with silk, but all the tumor could not be removed from them. The patient's condition became very poor, requiring considerable stimulation. The wound was closed with deep silkworm gut sutures, except for two inches at its lower end, which was left open for the removal of gauze packing left in place to control the remaining hæmorrhage. Duration of operation, thirty minutes. Subcutaneous injections, 1,000 cc. salt solution. Packing removed on the third and fifth days. Daily dressings were made on account of some sloughing from the depths of the wound. The wound, with the exception of the sinus down to the stump of the pedicle, was healed by first intention and stitches were removed on the eighth day. Sinus persisted, but the patient improved rapidly, and was up on the seventeenth day and discharged on the thirtieth day after operation. At that time he had gained much in weight and general appearance. Sinus still persisted. From the time of operation the twenty-four hours' amount of urine increased steadily, without the use of diuretics, and up to the

time of discharge varied from forty to fifty ounces. Urea remained about 30 grams. The specific gravity fell, and during the last week of his hospital stay was about 1,017. Nine months after operation patient was well, doing a fair day's work, and stated that he had gained over forty pounds in weight. A very small sinus still persisted.

Pathological Report. — The mass retains roughly the general outline of the kidney. It measures 16 cm. by 14 cm. by 12 cm., and weighs 1,500 grams. The surface is everywhere nodular and covered by the kidney capsule. The larger of these nodules is about one-fifth the whole mass, and is near the upper pole of the organ. The capsule, which is much thickened by dense, white, fibrous tissue, strips with difficulty, and is so generally adherent as to bring away tissue with it. On section the kidney cortex is evident only in a few places, it being mostly replaced by nodules of various sizes, discrete and confluent, dark red or yellowish in color, with a yellowish white trabeculation, and firm to the touch. The area of the pyramids is occupied by a mass of pale yellow elastic tissue which is distinctly trabeculated and limited in outline, and contain many small areas of hæmorrhage and a few areas of degeneration. The pelvis is enlarged and brilliantly injected. The calices are not distinct, but are occupied by bulging tissues due to the pressure of the tumor mass. Scattered over the inner surface of the pelvis are a few yellowish green areas of necrosis about the size of peas. Histological diagnosis: hypernephroma.

Case 2. — Woman, 52 years of age, entered the medical side of the Boston City Hospital April 14, 1903, on the service of Dr. George G. Sears. Her father died of yellow fever, her mother of intestinal obstruction. She has one sister and one brother living and well, and one child now living and well at the age of 26 years. She has never suffered from uterine disorders, and passed her climacteric at 46 years of age. She has always been well, and has had no illnesses during her adult life. On December 15, 1902, she stumbled and fell, striking the lower part of her back. She felt lame for a few days, but was about and received no treatment for the injury. On January 15, 1903, she began to have an indefinite attack of nausea, which lasted several days. She did not vomit and had no fever. She was up and about, but did not eat so much as usual. February 1, 1903, she suddenly had a severe attack of sharp pain in the right side, which radiated toward the bladder. She immediately passed much bloody urine, followed by a continuance of a dull, aching pain in the right lumbar region. She passed considerable bloody urine several times during that night, and this hæmaturia continued for twenty-four hours. With the disappearance of the hæmaturia the pain in the back passed away. During the following six weeks the patient had several attacks of pain in the right lumbar region, radiating toward the bladder, but had no further attacks of hæmaturia. She lost twenty-five pounds in weight, and failed considerably in strength. A slight frequency and pain on urination caused her to consult Dr. C. M. Green, who recommended her admission to the Hospital.

Physical examination: A well developed, fairly well nourished woman, nervous temperament, with dark skin. Eyes and mouth

negative. Pulses equal, regular, of good volume and tension. Heart area normal, action regular, sounds clear, with a soft systolic murmur at the apex transmitted into the axilla. Lungs negative. Abdomen symmetrical, full, lax, and tympanitic, except in the right hypochondrium, where there was dullness, continuous with liver dullness, which extended to the level of the umbilicus in the mammary line. The lower border of the dull area was easily felt, was smooth and convex, downward and descended with deep inspiration. There was no pulsation or tenderness over this area. The upper border of the liver dullness was at the sixth rib, and the left lobe of the liver did not appear enlarged. Neither spleen nor left kidney could be felt. Vaginal examination negative. Urine was pale, strongly acid, 1,016, a trace of albumin, much pus, and many squamous and neck-of-bladder cells; no blood. Blood: white count, 6,200; reds, 2,770,000. Hæmoglobin, 25 per cent. Patient was put to bed and received general tonic treatment. Many examinations for tubercle bacilli in the urine were negative, and differential blood counts showed nothing but moderate anæmia. The patient improved only slightly under tonic treatment, and the general conditions remained the same. Although the tumor mass in the hypochondrium did not give acute symptoms, an exploratory operation was advised and finally accepted. The patient was transferred to the service of Dr. F. S. Watson, May 25, 1903. Operation, May 27, 1903; Dr. F. S. Watson. Incision seven inches long beginning just below ribs was extended downward over the tumor mass. Wound was later enlarged by an incision four inches long at right angles to the centre of the first incision, outward between the ribs and the iliac crest. The peritoneum covering the kidney was filled with a network of dilated vessels. It was divided over the full length of the tumor, the bleeding points secured, and the cut edges sewed to the cut edges of the parietal peritoneum along the edge of the wound, thus shutting off the general peritoneal cavity and forming a pocket in which the tumor lay. It was firmly bound by adhesions at its upper pole. These were broken, the pedicle was clamped, and the vessels tied separately. There was much thickened tissue along their course, but as the kidney could not be delivered through the wound its character was uncertain. The ureter was much dilated, very friable, and broke several times while being tied. About eight inches of it was removed, but the remaining portion of it seemed undoubtedly affected. The patient's condition was poor and would not allow of further procedure. The wound was closed with deep silkworm gut sutures without drainage. During the operation the patient required stimulation by strychnine and 2,000 cc. of salt solution subcutaneously. Time of operation, one hour and twenty minutes.

During the first forty-eight hours after operation the patient's condition was poor, but gradually improved. For the first twenty-four hours after operation the amount of urine was only thirteen ounces. This gradually increased, and four days later reached thirty-five ounces without the use of diuretics. The urea at this time was 1.3 per cent., and there was no macroscopic and but little microscopic blood. Six days after operation there was evidence of acute suppuration in the centre of the

wound, and about two drachms of pus were evacuated. The patient's general condition steadily improved, and the wound, except for a sinus, which led down to the renal pedicle, healed by first intention, and the stitches were removed on the eighth day. Patient up on the twenty-eighth day. Urine remained constant in amount at thirty-five ounces, and the urea averaged 1.5 per cent. There was at all times a slight trace of albumin with a specific gravity of about 1,012, and a few hyaline casts and small round cells. After getting up the patient gained rapidly in weight and strength, but a small sinus persisted in the wound in spite of frequent dressings. She was discharged seven weeks after operation. Sinus healed at the end of the sixth week. Her general condition at this time was excellent, and she felt as well as at any time during the past ten years. Urea at this time was 1.9 per cent.

CASE II. By courtesy of Dr. F. S. Watson. Two-thirds actual size. Note the general reniform shape and nodular surface.

Pathological Report. — (See plates I. and II.) The mass retains the general outline of the kidney. It measures 12 by 9 by 8 cm. The external surface is generally nodular, with many points of injection from adhesions. The nodules vary in size from 3 to 6 cm. in diameter, and compose practically the whole upper half of the kidney. The capsule is thickened and firmly adherent over the nodular area. On section the whole upper half of the organ is occupied by a new growth, except for a small bit of renal tissue at the very tip. There is one large calyx in the lower half from which pyramidal tissue radiates. This area presents small, yellowish, discrete nodules a few mm. in diameter scattered through it, and the cortex is poorly defined. The tumor mass, which occupies the whole upper half of the kidney, extends from just beneath the capsule into the pelvis of the kidney. It possesses a distinct capsule of its own. The tumor is generally yellowish in color, with areas of hæmorrhage scattered through it. There is an irregular

trabeculation of a firm lighter colored tissue making many small compartments of yellwish or reddish yellow tissue. Some of these areas have degenerated and are soft, but for the most part the growth is firm and elastic. Histological diagnosis: hypernephroma.

Section of tumor, Case II. Note encapsulation; stroma causing nodular appearance; areas of hæmorrhage and necrosis; destruction of and encroachment upon renal tissue.

Case 3. — Man, 52 years old, entered the service of Dr. Paul Thorndike, Boston City Hospital, on January 17, 1903. Father died of tumor of the abdomen, about which patient knows nothing. Mother died of cancer of the breast. Two brothers living and well. Patient has always been well. Habits always good. Present illness dates back fifteen weeks, at which time he began to have a dull aching pain across the lower back. Pain was constant and did not radiate. One week later the urine became bloody for forty-eight hours, during which time he passed a good deal of blood and several clots. These clots occasionally stopped the flow of urine and caused considerable pain, referred to the corona glandis. At the end of forty-eight hours the urine again became clear and remained so for three days, at the end of which time he had another attack of hæmaturia lasting thirty-six hours. Urine then remained clear for eight days and again became bloody for twenty-four hours. After this third attack the urine remained clear for fifteen days, when the present attack began; but this present attack had already existed for four days when the patient entered the Hospital. During these attacks of hæmaturia there was frequency of urination (every ten or twenty minutes), and the passage of clots often stopped the stream of urine momentarily and caused considerable pain, referred to the corona glandis. Between the attacks there was no frequency of urination, and there was no difficulty in starting the stream, the caliber and force of which were unchanged. The pain in the back usually

dispppeared with the onset of an attak of hæmaturia. Patient has never passed any stones or gravel, and has none of the usual symptoms of vesical calculus. Has lost ten pounds in weight and considerable in strength during the past four months.

Physical examination shows a well developed and nourished man with a dark but anæmic skin, and a nervous temperament. Eyes, mouth, neck and thorax normal. Pulses equal, regular, and of good volume and tension. Abdomen full, symmetrical, soft, tympanitic, not tender. Nothing abnormal found. Neither kidney could be felt; no tenderness nor spasm on deep palpation on either side. Urine at entrance was bloody, neutral, 1,008; albumin, a large trace; no sugar; urea, 2.02 per cent. Much normal and abnormal blood and a few large squamous cells. White count, 12,000. Soft rubber catheter, 18 French, could be easily passed into the bladder, and bladder washed clear from blood, which showed that if the bleeding was from the bladder it was slight. The bladder capacity was about eleven ounces. The stone searcher revealed no stone, and was followed by no increase of hæmorrhage. The hæmaturia continued for four days after entrance, and he passed many clots, which were worm-like in shape, of small caliber, and varying in length from 1 to 5 cm., and were believed to be ureteral casts. During these four days of hæmaturia the twenty-four hours' amount of urine varied between twenty and thirty ounces, and was voided in small amounts about every hour. During the twenty-four hours after the disappearance of blood from the urine the patient experienced no lumbar pain, and the amount of urine jumped to forty-four ounces, and the urea 3.3. During the next twenty-four hours the urine again dropped back to twenty-six ounces and the pain returned to the back, but no blood appeared in the urine.

At this time the cystoscope showed a normal bladder wall with no areas of hæmorrhage, no evidence of new growth, and no foreign body in the bladder. From the left ureteral orifice there projected a worm-like piece of blood clot about 2 cm. in length. The right ureteral orifice ejaculated a normal-colored urine at the usual rate. About six hours after the cystoscopy the urine became bloody, and contained an ureteral cast about 5 cm. long. Bleeding continued for about ten hours, and then ceased. The following twenty-four hours' amount was twenty ounces. Another cystoscopic examination five days after the first showed the same general features. There was no urine being ejaculated from the left ureteral orifice, and the right eureteral orifice was normal in appearance and ejaculated a clear urine. At this examination a segregator was introduced into the bladder, and no urine obtained from the left side. That obtained from the right side was only tinged with blood, which was probably due to the previous examination.

Operation, Dr. Paul Thorndike. Left lumbar incision. Kidney found moderately adherent to the surrounding fat, from which it was separated and delivered into the wound. It was not enlarged, but presented several small nodules on its surface. One of these was cut across and a diagnosis of new growth was made. The pedicle of the kidney was clamped and the vessels tied separately and en masse, and the organ removed. External wound closed with interrupted chronic

gut sutures, except for an opening at the lower end of the wound, through which an iodoform wick was carried down to the stump of the renal pedicle. Time of operation, thirty-five minutes. Salt solution 1,000 cc. subcutaneously immediately after operation. Wick removed two days later. No further blood in the urine. Urea twenty-four hours after operation was 2.9 per cent. Twenty-four hours' amount of urine, from twenty to thirty-seven ounces. Patient felt from the first that he was going to die, made no effort to rally, took his nourishment badly or not at all, gradually grew weaker, and died a week after operation. No obvious reason for death could be discovered.

CASE III. Four-fifths actual size. Note sub-capsular site; definite encapsulation; areas of hæmorrhage and degeneration.

Pathological Report. — (See Plate III.) Gross specimen retains the general, normal shape of the kidney. The mass measures 12 x 6 x 5 cm. and weighs 142 grams. The surface is smooth and brownish in color. In the upper pole is a conical elevation 1 cm. above the surface and 3 cm. in diameter. It is covered with kidney capsule and is firm to the

feel. The capsule strips easily, leaving a smooth surface everywhere except over this elevated area, where it is closely adherent, and when torn away leaves a firm, white, fibrous tissue beneath. On section the cortex is distinct, and is slightly thicker than normal. In the upper pole, in the region occupied by a new growth, it is destroyed.

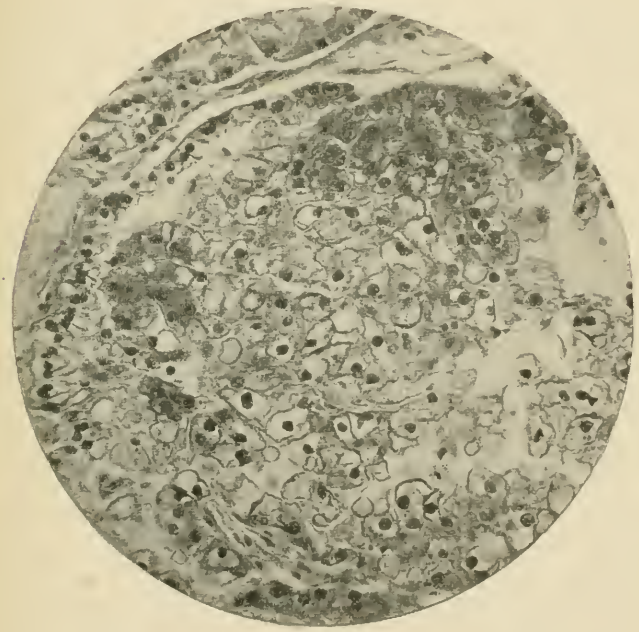
The pyramids are distinct, but those in the upper pole are destroyed by an area of new growth. This area is 5 cm. in diameter, almost spherical in shape, generally yellow in color, and is definitely encapsulated by fibrous tissue 3 mm. in thickness. Throughout this area runs a thick stroma with areas of hæmorrhages varying from .5 to 1 cm. in diameter, and with other smaller areas of necrosis scattered through it. The pelvis of the kidney is somewhat enlarged, and has thinned walls. Histological diagnosis: hypernephroma.

Since Grawitz' articles in 1883 and 1884 numbers of these and similar cases have been reported by French and German writers, but most of them have served as examples illustrating points in a varied controversy of a histological character, and although many of the cases have been reported with great care and detail, the literature of the subject up to date remains distinctly histological in character, and no efforts have apparently been made to indicate and formulate a clinical picture which may perhaps prove of diagnostic value. It seems proper, therefore, to make a brief résumé of such symptoms in this paper, and to base it upon the histories of reported cases as well as upon the three instances included in these pages. The symptoms which at once call themselves to our attention in these cases are, recurrent attacks of hæmorrhage associated with frequency of urination, and often profuse enough to lead to the passage of clots, which in their journey down to the bladder sometimes get caught, stop the stream of urine (often for hours or days, as shown by diminishing amount of urine) and cause pretty severe pain, usually referred to the corona glandis. Between these periods of hæmorrhage are periods characterized by no frequency of urination, but by a diminished amount of urine and urea, and a marked pain in the back, persisting continuously and disappearing only with the onset of a new attack of hæmaturia. This condition is in marked contrast to the pain, in cases of renal calculus. Calculus pain is, of course, coincident with the blood which the irritation of the calculus causes. This alternation of periods of hæmorrhage and fre-

Stained with methylene blue and eosin. X 25 diam. Note thin capsule with lymphoid cell infiltration below; wide vascular spaces; general tubular or adenomatous appearance; areas of degeneration above (pale staining).

Stained with methylene blue and eosin. X 80 diam. Note vascular stalks; tubular appearance emphasized by lighter spaces (in part due to cell degeneration) lying outside well-nourished cells immediately facing capillaries.

quency with periods of no hæmorrhage and no frequency, but of marked pain in the back, have seemed both distinct and constant enough to merit mention and emphasis; and these alternating periods had a beautiful illustration by the cystoscopic views obtained in Case 3, where the clot obstructing the mouth of the left ureter could be readily seen, coincident with the sudden cessation of hæmaturia, marked drop in the twenty-four hours' amount of urine, marked diminution in the amount of urea and a return of the lumbar pain. Then a few hours later there was an equally sudden return of the hæmaturia and the passage of a ureteral cast of blood clot.



Stained with methylene blue and eosin. X 200 diam. Note oval or polygonal shape of cells; preservation of their rim of cytoplasm; deeply staining nuclei sometimes lying upon cytoplasm threads; the perinuclear, lightly staining spaces, often filling the whole cell, and somewhat characteristic of hypernephroma.

The accompanying plates illustrate beautifully characteristic points of both the gross and microscopic pathology of these growths. These points, already mentioned in the text, are briefly as follows:

1. An affected kidney may not be much increased in size, but is generally very large.

2. The general outline of the organ is usually retained, and the surface is almost always nodular, although occasionally there is no external evidence of the growth.

3. The new growth is either encapsulated within the kidney substance or just below the kidney capsule.

4. On section the tumor tissue is generally yellowish, with a firm and distinct stroma, which gives the growth a nodular appearance. Some of these nodules usually show areas of hemorrhage and degeneration.

5. The kidney tissue is either destroyed or pressed upon and distorted by the new growth.

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XVI.

THE TREATMENT OF DIFFUSE PERITONITIS.

By F. B. Lund, M.D.

By diffuse peritonitis is meant that rapidly spreading inflammation of the peritoneum which results from perforation of the appendix or other viscus, in which the inflamed area is covered with pus or fibrin, and is not walled off by adhesions from the peritoneal cavity. Such a peritonitis may, if it has invaded all the recesses of the greater peritoneal cavity, be called a general peritonitis. A general peritonitis differs in extent and not in character from a diffuse peritonitis. This condition is one which the surgeon is called upon so often to treat, and one in which his methods and results are of so great importance to his patients, that a thorough discussion of the methods is always of vital interest.

Whatever methods are adopted, a large mortality will always attend the surgeon's efforts in those cases of peritonitis which come to him late, with the greater portion of the abdominal cavity invaded by the process and the system overcome by toxæmia. Nevertheless, by intelligent methods of treatment, the mortality, even in extensive, if not entirely general, cases of diffuse peritonitis, has been greatly lowered, and it is to some of the methods which in the writer's experience have seemed to contribute to this lowering of mortality that he wishes to call attention in this paper.

The literature of the treatment of diffuse peritonitis is enormous, and methods of treatment which seem diametrically opposed have or had their ardent advocates. One writer advises irrigation; another condemns it because it distributes

infectious products through the peritoneal cavity. One advises drainage, another avoidance of drainage, etc., so that to the uninitiated the matter seems to be in a state of apparent confusion. Even as to the point which seems to the writer the most important feature of the treatment, *i.e.*, that the infecting focus should be immediately removed, there is still a difference of opinion among surgeons. It is to this point, which seems to him one of vital importance, that the writer would first invite attention.

There can be no question that the peritoneum will absorb or segregate by adhesion a certain quantity of infectious material. But if an indefinite supply is poured into the cavity by a necrotic perforated appendix or ruptured intestine the peritoneum cannot take care of it. A surgeon in a large hospital who has been called upon to treat cases of general peritonitis which have been poorly observed, neglected and have not sent for surgical aid until the entire abdomen was invaded by the process, the intestines paralyzed, and the patient suffering from septicæmia, finds it hard to believe that, without the removal of the infecting viscus, the peritoneum can wall off all septic processes. In perforative peritonitis, early or late, the removal of the infecting focus is imperative, as so well stated by Dr. Joseph A. Blake of New York in a recent article on the treatment of diffuse peritonitis: "The advocates of the treatment by rest will concede that the patient will be much better off with the appendix out if it can be done without operation. We have then simply to weigh the dangers of toxæmia and the shock of operation against the danger of continued infection, both systemic and peritoneal from the appendix itself, or the escape of its contents."

With a short anæsthesia and quick operation the danger of interference is much less than that of procrastination. Dr. A. J. Ochsner of Chicago, the most eminent advocate of the waiting policy in diffuse peritonitis, states that at no matter what stage a case of diffuse peritonitis comes into the hands of the surgeon, in case the stomach is washed out and nothing administered by it, nourishment being kept up by rectal injections, thus keeping the stomach and small intes-

tines absolutely at rest, in a vast majority of instances the process will become walled off, the acute symptoms subside, and the patient can be safely operated upon at a later date. Dr. Ochsner adduces statistics in proof of his contention.

This policy of waiting in acute perforative peritonitis has been tried at the City Hospital, and the writer has occasionally seen a case which exhibited the symptoms of a diffuse peritonitis wall off and quiet down. A more frequent result of this policy has been the progress of the disease to such an extent that the operation had to be done under conditions much more serious than obtained when the case first presented itself. These cases have afforded a comparison of the value of quick anæsthesia and operation with a waiting policy. In the former case the patient suffers no shock, but is relieved from the constant influx of septic material from the infected organ. The current of infectious material is started out of the abdomen instead of into it, and the patient is placed on the road toward recovery.

Ten years ago, the writer well remembers the position taken by Dr. Worcester, of Waltham, at a memorable discussion in Boston, in which he advocated the early operation, or as soon as the diagnosis is made, in all cases of appendicitis. He well remembers the controversy that followed, in which several of Boston's most noted physicians and surgeons advocated the policy of waiting for the formation of the abscess and of adhesions before operating. The courage displayed by Dr. Worcester at that time has been rewarded by the adoption of his opinion by the majority of conservative surgeons throughout the country. Experience has proved that a patient with a perforation draining outside the abdomen is much better off than if with one enclosed within its impermeable walls and free to distribute poison throughout its cavity.

The writer has observed so many cases of appendicitis apparently "quieting down," with a normal temperature and pulse, in which a sudden rise of temperature and an alarming aggravation of the patient's symptoms have proclaimed a perforation or rupture of an abscess previously limited by adhesions, that he is convinced of the dangers of a waiting

policy. The dangers of an early operation in which drainage is employed, are not much greater than that of the operation in the interval, and many lives which would have been sacrificed by waiting for the subsidence of the acute attack, are unquestionably saved.

Where cases are seen early, as they should be, by the surgeon — within twenty-four or forty-eight hours — all will admit that there should be no question of waiting for the interval with its danger of perforation, but that operation should be done at once. In cases seen later, after the process has had a further start, a waiting policy is indicated still less. After the fire has a better start it is still more dangerous to wait before turning on the hose on the flames.

Now in regard to the methods of treatment. Granting the importance of immediate removal of the infecting focus, a complete removal of all necrotic tissue is indicated whenever possible. In the first place a complete removal takes the entire source of infection out of the peritoneal cavity, instead of leaving a smouldering focus behind to prolong the period of suppuration and the necessity of drainage. Where the appendix is the source it should always, where feasible, be removed entire. The writer firmly believes that in a case of salpingitis where, as he so frequently has seen, one badly diseased tube is removed, and another, which is only slightly inflamed and contains only a little pus, is left behind, because it is considered improper to sterilize the patient, an absolutely wrong policy has been followed. The tube which has been left behind remains as a smouldering focus of infection, and not infrequently becomes the cause, if not of acute peritonitis, at least a chronic peritonitis causing bands of adhesion between the intestines and the pelvic wall. It often becomes acutely inflamed, and necessitates a second operation for its removal, an operation rendered much more difficult by the adhesions resulting from the previous operation, and the chronic inflammation. Further, a chronically inflamed appendix stump may be the cause of fresh fibrinous adhesions throughout the peritoneal cavity, resulting in intestinal obstruction requiring operation for its relief. A thorough removal, therefore, of the infected focus is neces-

sary as well for the future as for the immediate welfare of the patient.

The second object to be attained after a removal of the infecting focus is a thorough cleansing of the peritoneal cavity and the placing of it under the most favorable conditions for the subsidence of the infection and return to a normal condition.

For this purpose for several years the practice at this Hospital has been in the majority of instances in cases of diffuse peritonitis to thoroughly irrigate the peritoneal cavity with deci-normal salt solution at a temperature of 110°. This process the writer believes to be of great importance and value. Through a long glass nozzle of large calibre pushed into all the recesses of the cavity several quarts or gallons of salt solution are introduced, which comes out of the wound with a violent rush and brings out fragments which otherwise would have remained to prolong suppuration and interfere with convalescence. A warm salt solution soothes instead of irritating the peritoneum, and cleanses every portion of it without rendering necessary the removal of the intestinal coils from the abdominal cavity with the shock which accompanies that procedure. A certain amount of salt solution is left behind, which, being absorbed by the lymphatics, increases the amount of fluid in the vascular system. Another portion of the fluid is immediately taken up by the gauze which is used for drainage, and starts a current from the abdomen out into the dressings and aids in removing any infectious material which may not have been washed out during the operation. From every point of view, then, the process of irrigation seems to be a valuable one. The infectious material is not spread by it from one portion of the peritoneal cavity to another, because through the tubes it is carried to the bottom of the pelvis and other peritoneal recesses, and the current is from there out from the wound, not through the wound into the distant portions of the peritoneal cavity. A certain amount of loose fragments of fibrin are washed out by this irrigation, but attached portions must be left behind. The writer believes it wiser to leave them there than attempt their removal. The occasional washing

out of a fœcal concretion, which otherwise would have been left behind is a valuable result of this procedure.

Only a few years ago Dr. Finney, of Baltimore, advised removal of the intestines from the abdominal cavity and sponging with gauze to remove adherent flakes of fibrin from them, but this process leaves raw bleeding surfaces with lymphatics open for further infection. It also increases the shock of the operation by evisceration and handling of the coils. The writer believes that is an unnecessary and usually harmful proceeding.

After removal of the infecting focus and infectious products the next question to claim attention is that of drainage. The writer is an advocate of gauze drainage for the following reasons: In the first place, even if only for a few hours before adhesions are formed about the drainage wicks, these wicks by capillarity remove a large quantity of fluid, some of it presumably septic, from the peritoneal cavity. The irritating effect of the gauze causes, immediately after the drainage of the fluid, the formation of adhesions which wall off the infected area from the general cavity and prevent further reinfection of that cavity, and the subsequent formation of local residual abscesses by any infected material which it may not have been possible to remove at the operation. For the drainage of the pelvis gauze wicks are used, and among them is placed a glass tube passing to the bottom of the pelvis. The glass tube is not of much direct value as a drain. It is removed at the end of twenty-four hours, and is generally found at that time filled with coagulated fibrin. The writer believes it of value, however, in keeping the gauze in the original position in which it is placed, and preventing its becoming entangled by the movements of the intestines, thus possibly producing obstruction. Gauze drainage alone is employed for the stump of the appendix, and is generally sufficient for drainage of the right flank. The wrapping of gauze wicks in rubber tissue, while it facilitates their removal, prevents, in the writer's opinion, the action of the gauze in the production of adhesions, and is a harmful rather than useful procedure. About such a drain, instead of hard and dry adhesions, as in the case of a

gauze drain, there form soft and moist barriers. It does not seem to the writer that ease of removal compensates for the other disadvantages of such drains. The tube, as stated above, is removed at the end of twenty-four hours; the gauze drains, if the cases progress well, are removed in about four or five days, being slightly loosened on the second and third days, and on the fourth day carefully removed. If they are removed carefully and slowly, one at a time, an anæsthetic usually is not necessary.

Dr. Blake, in his paper quoted above, advocates the abandonment of the drainage, and supports his contention by a series of cases in which the drains were not carried into the peritoneal cavity, but through the wound; or, in other words, he does not close the wound, but allows the peritoneal fluid to flow out through it, carrying his drain, as far as the writer can make out from the description, to the bottom of the parietal wound, but not into the peritoneal cavity. He advocates the use of drainage only in case it has been impossible to remove the necrotic material, and in cases where there is doubt whether all the infectious material has been removed. It seems to the writer that this doubt does exist in a large majority of cases of diffuse peritonitis, and he therefore advocates the general use of gauze as drainage. Gauze drainage, where properly used and supported by tubes, has not in the cases observed by the writer been the cause of intestinal obstruction.

The assistance of abdominal drainage by gravity has been suggested and tried many times. A few years ago in the Johns Hopkins School, elevation of the foot of the bed was suggested after suture of the abdomen, in order that the abundant lymphatics of the diaphragm might take care of what infectious material had been left in the peritoneal cavity. This procedure was quite extensively tried, but was found uncomfortable, and attended by, at least, no decrease of mortality, and has been generally abandoned.

The opposite procedure, namely: The elevation of the head of the bed after drainage of the abdomen in order to permit immediate flow of the fluids left after operation into the pelvis, whence they are quickly sucked out by the

capillary action of the gauze and tubes, has *a priori* more to recommend it. It was suggested to the writer by Dr. Murphy, of Chicago, who stated that his cases of perforative peritonitis were brought to the hospital sitting up in the ambulance, and were kept sitting up in bed in an almost upright position after the operation. The writer tried this procedure in a severe case of general peritonitis on a little boy in the Hospital. The greater part of the cavity of the peritoneum was infected. The boy, after the usual operation and appendectomy, was drained by a large rubber tube brought out at the lower end of the wound and kept sitting up in bed by strapping the legs to a Bradford frame, with his back against a head rest. Although the position was somewhat exhausting, the drainage was very free from the wound, and the boy made an excellent recovery. He was allowed to recline after the fourth day. There were no complications in the way of secondary abscesses. The next case, a little girl, in very poor condition, with general peritonitis, in which this plan was tried, proved fatal. The position was very irksome to the child, and, although drainage was free, she grew so weak that she had to be lowered in bed.

Since these experiences the writer has confined himself to the elevation of the head of the bed, about one foot above the level, by placing under the head of the bed the blocks which are ordinarily used to elevate the foot of the bed in fractured femur. One or two pillows are also placed beneath the shoulders. This position gives slant enough to the body to allow the fluid to flow from the flanks into the pelvis, and is not exhausting to the patient as is the more complete upright position. The writer believes that where elevation of the head and shoulders is used the incisions in the flank which were formerly not infrequently practised by him are unnecessary. The cases in which moderate elevation has been practised, and these included all the cases which have come under the writer's care since last spring, there have been six cases with four recoveries, certainly a favorable showing, although the number is at present too small to prove of value in forming an estimate of the method. The procedure

is one that certainly does no harm, and, it seems to the writer, is probably an aid in the treatment of these cases.

In regard to that grave class of cases of general peritonitis accompanied by distention of the intestines, which frequently, when the surgeon is first called to see them, present the appearance of cases of intestinal obstruction, a few words only should be added here. The subject was fully discussed and elaborated upon by the writer in a paper "On the Value of Enterostomy in Selected cases of Peritonitis," published in the Journal of the American Medical Association for July, 1903. In the treatment of these cases, in addition to the measures given above, an incision about one inch long is made in the small intestine, and the distended coils drawn outside the abdomen as far as possible, emptied of their contents, and two ounces of a saturated solution of Epsom salts injected into the lumen. The opening is then closed with a continuous suture of silk or linen thread. After the operation on these patients early attempts are made to move the bowels by enemeta of turpentine, glycerine or saturated solution of Epsom salts, and if these efforts prove ineffective, the distention of the abdomen increases, and the patient grows worse, a secondary enterostomy is done. This procedure consists in opening the abdomen in the median line by a short incision, suturing the first distended coil of small intestine which presents to the transversalis fascia, tying in a glass tube connected with a rubber tube, and thus giving the fæces a direct opportunity to escape and allowing the paralyzed intestine to recover itself. This procedure has proved effective in certain desperate cases where death was apparently impending after operation for diffuse peritonitis. For the details of the cases and full discussion of the method the reader is referred to the paper given above.

On looking over the records of hospital and private cases for the last four years the writer finds that he has operated upon thirty-four cases of general peritonitis in which all, or at least four-fifths, of the greater peritoneal cavity were involved in the process. Cases of diffuse peritonitis covering only a slight area have not been included. Twenty-three of these cases were due to perforative

appendicitis, of which ten recovered and thirteen died, a mortality of 57 per cent. Most of these cases which died were in very poor condition. Four were moribund, the pulse being so weak that no attempt was made to find the cause of the peritonitis; the abdomen was simply opened and drained by a glass tube in the pelvis; two of these operations were done under local anæsthesia, as the patients' condition and constant vomiting precluded a general anæsthetic; no cases were refused operation on account of the poor condition of the patient.

Of the remaining eleven cases, four were due to salpingitis. Of these cases one recovered and three died; one was due to perforating typhoid ulcer, also died; two to rupture of intestine by external violence, of these one died and one recovered; one to perforated gastric ulcer, which recovered; one fatal case due to perforated duodenal ulcer; and one to perforation of the posterior *cul de sac* by a splinter of wood introduced through the vagina. We have, therefore, a total of general peritonits from all causes of thirty-four cases with twenty deaths, or 59 per cent.

The writer's time has not been sufficient to analyze the records of the cases of early diffuse peritonitis upon which he has operated during that time. The mortality of the early cases, however, has been extremely low. One case of perforated typhoid ulcer, which was fatal; one case of perforated gastric ulcer, which recovered; and one case of ruptured intestine, which recovered, are not included in the above list of thirty-four cases, because the peritonitis, though diffuse, was not extensive enough to be termed general.

Complications in the way of residual abscess formation, etc., have been rare. Intestinal distention, which could be definitely attributed to the pressure of gauze drains has not occurred in the writer's experience, except in perhaps one case, and in this case the cause of the distention was doubtful. One of the cases of general peritonitis died in ten days after the operation of portal phlebitis, the peritoneal process having subsided. The writer's cases of enterostomy previously published have not been included in these cases, as in none of those cases was the peritonitis general at the time

of the primary operation. In three of the fatal cases used as the basis of this paper secondary enterostomy was done unsuccessfully, but the patients died from septicemia, and not from abdominal distention. Although the mortality in the above list may seem high, yet it seems to the writer that the showing is on the whole a favorable one, when one considers the lateness of the operation and the desperate condition of a large number of the cases which are brought to this hospital, and although nothing particularly new has been contributed to the treatment, he has felt that, from time to time, a discussion of the treatment of so important and frequent a class of cases is in order.

In view, also, of the recent advocacy of the rest treatment of peritonitis and of the great conflict of opinion regarding the propriety of most of the methods which experience has proved in the writer's hands to give the best results, he has felt it his duty to present his reasons for his attitude, and if this paper has any influence in establishing procedure of the early removal of the cause of diffuse peritonitis, he will consider his task well worth while.

XVII.

A CASE OF SARCOMA OF THE LOWER JAW.

By F. B. Lund, M.D.

The accompanying case is reported in order to illustrate the slight amount of deformity which results from subperiosteal excision of the body of the lower jaw, from the lateral incisor tooth to the angle. The patient, a young girl of 13, was operated upon on the 16th of July, 1903, for a sarcoma of the lower jaw, which began in the medulla, had caused a fusiform swelling of the lower jaw, had forced its way upward through the alveolar process and grown up into the mouth as a papillary growth which had been considered an epulis. The anterior molars and rear bicuspids had been pushed inward and loosened by the growth. The patient was etherized, and the portion of the tumor projecting into the mouth removed with scissors, and examined by the microscope, proving to be a giant-celled sarcoma. An external incision was then made along the body and angle of the jaw, the facial artery divided, the periosteum peeled from the entire body of the jaw and the jaw divided by a saw and cutting forceps just anterior to the socket of the canine tooth in front and at a point on the ramus of the jaw, level with the alveolar process behind: The sub-maxillary gland was removed; the lingual and hypoglossal nerves were exposed during the operation and the latter, having been partially divided, was sutured with fine silk; all suspicious bits of tissue were cut away, divided muscles and deep tissues sewn with catgut, and the skin incisions with a subcutaneous horse hair suture; the mucous membrane was

sewn inside the mouth with catgut. The patient made an excellent recovery from the operation, but the wound suppurated, undoubtedly owing to the infection from the mouth, and had to be drained. It finally healed well, however, and

the periosteum has evidently replaced the lost bone to a very considerable extent, as a firm bony bar can be felt in the place of the bone which was removed. The photograph shows that the deformity on front view is very slight; the

scar on lateral view is rather deep and conspicuous, but will fade out considerably in time, after which the deformity on side never will be much less marked.

XVIII.

INTESTINAL PARASITES IN APPENDICITIS AND PERITONITIS.

By Joshua C. Hubbard, M.D.

Case I. — C. V. C. entered the service of Dr. Bolles, who permits me to report the case, on December 28, 1902. She was born in Boston, and still lived there. She was 9 years old. The family history and previous history were both of no importance. The present illness began five days previous with a chill, vomiting and abdominal pain, cramp-like in character, localized about the umbilicus. For the past two days the pain has been less severe, but has become localized in the right inguinal region.

Physical examination in brief. Well developed and nourished. Pulse, 124. Temperature normal. Apathetic. Facies slightly peritoneal. Heart and lungs normal. Abdomen symmetrical, slightly distended. An area of dullness near the right anterior superior spine and in the right flank. All the abdominal muscles in a state of spasm. Tenderness slight in the epigastrium and marked in the right lower quadrant, but not general.

An immediate operation was decided on, and under ether a muscle-splitting incision was made at McBurney's point. As soon as the peritoneal cavity was opened several ounces of creamy pus welled up. Pus wiped away and the pus cavity found not well walled off from the general abdominal cavity. The mesentry of the appendix was easily found and tied off with chromicized catgut. The appendix was tied off at its base and cut away. The stump was touched with carbolic acid. The peritoneal cavity was then washed out with many bottles of salt solution. The pus was found to come from the peritoneal cavity generally. Wicks were placed in various directions and the wound was partially closed. The appendix was red swollen, gangrenous and perforated at one point. It contained two small worms, identified by the pathologist as pin worms. The bacteriologist reported staphylococcus pyogenes aureus and bacillus subtilis in the pus. At the close of the operation the patient was moribund, but rallied under stimulation, and lived till the evening of the next day.

Case II. — G. H. B. entered the Boston City Hospital March 5, 1903. He entered the service of Dr. Bolles, but being an emergency came under my care. He was 16 years old, a painter by occupation. The

family and previous histories were unimportant, except that he had never been troubled by indigestion. On March 1 he had an attack of abdominal pain, and took some medicine to cause vomiting. The next day he went to the Boston Dispensary complaining of constipation, colicy pain and tensmus. The examination was negative, except for general tenderness over the abdomen. March 3, the condition was the same. Temperature 97°, and pulse 120. March 4, about the house all day till afternoon, when he went to bed feeling worse. Restless and delirious through the night. Abdominal pain more intense. March 5, seen by Dr. Colburn, to whom I am indebted for a large part of the history, and was sent to the hospital immediately. Pulse 130, and temperature 95°. I saw him as soon as he reached the Hospital. His condition was then very critical. There was general cyanosis. The extremities were cold, and the abdomen was distended. There was general spasm of the abdominal muscles. The condition was evidently general peritonitis, and although the boy was moribund it seemed best to give him even a forlorn chance, so under very light anæsthesia incisions were made quickly through the abdominal wall in several places. As soon as the peritoneal cavity was opened a large quantity of purulent material of the consistency of pea soup gushed out. Drainage tubes and gauze wicks were rapidly put in place and an intravenous injection of salt solution given. The patient lived several hours, and then died in spite of stimulation. At a partial post mortem examination a dead lumbricoid worm was found free in the general peritoneal cavity, and another half way through a perforation in the appendix.

While cases of appendicitis are occasionally reported where thread worms (oxyuris vermicularis) are found in the appendix, those with lumbricoid worms (ascaris lumbricoides) are less numerous The interest in these cases centres about the etiological importance of the parasites, whether they have any direct influence on the inflammation of the appendix or whether their presence is simply a coincidence. They may have the same relationship to appendicitis as any foreign body. A foreign body lying in the appendix may cause appendicular colic due to the muscular contractions in the appendix from the attempts to expel it. An actual inflammation is brought about in the following manner: The foreign body irritates the mucous membrane, which becoming swollen throws out an increased amount of secretion. As this cannot escape from the appendix, the lumen being blocked by the swelling of the mucous membrane about the foreign body, it distends the organ. The circulation is thus altered and the vitality of the appendicular

walls decreased and an opportunity thus offered for the entrance into its walls of bacteria present, with a resulting inflammation. In such cases the inflammation is due to the presence in the lumen of something foreign to the normal contents, a fæcal concretion, a worm, etc., and is in no way dependent on the characteristics of that particular form of foreign body. Does the inflammation of the appendix containing an intestinal parasite have any direct relation to that parasite because it is a worm and not a mass of hardened fæces and because it has certain definite characteristics and manner of life? While the question is still open for some of the intestinal worms, for others it seems to have been fairly well settled both by the clinician and the pathologist.

Clinically the etiological importance of intestinal worms has been shown by Metchnikoff (Bull. acad. d. med. Paris 1901, 3s XLV., 301) who reports the histories of four cases of appendicitis. Most of the four had several recurring attacks of apparently typical appendicitis. Metchnikoff, finding in the stools of the patients either the eggs of intestinal worms or the worms themselves, gave to his cases vermifuge medicines. The cases all recovered. There were no more recurrences, and when the series was reported the patients had been free from any suggestive symptoms for some length of time. He feels so strongly the importance of these worms as an etiological factor in appendicitis that he advises the examination of the stools in all doubtful cases of appendicitis and as a routine practice in children, that the worms may be destroyed in time to prevent an attack.

The parasites most commonly found in cases of appendicitis and general peritonitis are trichocephalus dispar, ascaris lumbricoides, and oxyuris vermicularis.

The proof of definite relationship of cause and effect between trichocephalus dispar and appendicitis has been shown in the work of Askanazy (Deutsch. Arch. f. klin. Med. Bd. LVII., S 104.) He published in 1896 an article on the source of the food supply for this worm. Examining the worms microscopically he found in them a substance which reacted to the test for iron, and which originated he felt sure in the hamoglobin of the host. To get this food

the worm must necessarily suck the blood of the host. He noticed that often at autopsy a worm was so firmly adherent to the mucous membrane that attempts to dislodge it resulted in either tearing the mucous membrane or breaking the worm. Hardened specimens showed that a greater or less part of the worm disappeared into the mucous membrane.

Microscopic examination of sections showed that a portion of the worm had bored its way into the mucous membrane, and had not simply penetrated preëxisting openings. These wounds of the mucous membrane may then allow the entrance of bacteria. Girard (Annals de l'Instut. Pasteur, 1901, XV. 440) has demonstrated this very prettily. The case was that of a child of 8 years, who developed symptoms of peritonitis, the localizing signs being on the left. The peritoneal cavity was opened, allowing the discharge of a seropurulent fluid. The appendix appeared normal, but was removed as a precautionary measure. It was hardened and then cut into sections. By this two trichphephali were found. The sections proved that trichocephalus can force its way into the mucous membrane. Girard describes the sections as follows: "The appendix is absolutely healthy in appearance. There is no trace of either old or recent inflammation anywhere except at the point where the anterior extremity of the trichocephalus has penetrated into the mucosa. At this place there is a zone of inflammation. A large number of mono and polynuclear leucocytes are seen, some among them showing destruction of the nuclei. In the midst of the cellular detritus are bacteria, streptococci and cocon bacilli. The inflammation around the trichocephalus is then due to the introduction of the intestinal microbes by means of the nematode." In this case an active inflammation was set up about the parasite, due directly to it as a living worm leading its own individual life. It follows, therefore, that a trichocephalus may furnish the primary and direct cause for an attack of appendicitis.

The proof that ascaris lumbricoides ever causes an inflammation of the appendix as a result of its life struggle, is less clear than in the case of trichocephalus. Ascaris is known to often force its way into narrow channels like the appendix

and gall duct. When it clogs the lumen of the appendix it acts, as I have already shown, as a foreign body. I believe that it can do more than this, as it is not an inactive mass. It is very easy to conceive that by its struggles it may perforate a diseased appendix, which, if it contained a lifeless foreign body, would have remained intact. It may thus change a comparatively simple case of appendicitis into a very complicated one. The question whether it can perforate a healthy intestine is still under discussion, though a case recently reported (Ager, J. Am. Med. Assoc., Feb. 28, 1903) seems to show that it may. Askanazy attempted to show the same relationship true between ascaris and appendicitis, as between trichocephalus and appendicitis. He found in the intestinal epithelium of the ascaris a material which reacted to the test for iron as did that in the trichocephalus. He felt, therefore, that this iron came from the blood of the host, and that it was fair to assume that the ascaris obtained it by sucking his blood. To suck the blood the mucous membrane must necessarily be wounded, and entrance given to bacteria.

When we come to oxyuris vermicularis, the proof of its etiological value as a cause of appendicitis, other than through its presence as a foreign body is lacking. The pin-worm is generally considered an inhabitant of the rectum and lower part of the bowel. That this is not true is shown by the frequency of its occurrence in the appendix in a series of 200 autopsies done by Still (Brit. Med., J. Vol. I., 898) on children under twelve years of age. He found pin-worms in the intestine in thirty-eight cases, in twenty-five of which they were in the appendix. In six they were in the appendix, and nowhere else in the large intestine or cæcum. Sometimes they are found in the extreme tip of the appendix, as in the case of a boy who died of pleurisy and pericarditis. Before death he complained of pain in the right iliac fossa. At the autopsy the appendix was found thickened and in a condition of catarrhal inflammation. In the distal, 2¼ inches, 111 worms were found. No others were found anywhere in the intestine. Some have thought that oxyuris might wound the mucous membrane of the

appendix by its wriggling, and thus, by furnishing a place of entrance to bacteria, cause an attack of appendicitis. This theory as far as I know has not been substantiated by any definite proof, and remains, therefore, simply as an attempt to carry the relation that exists between the two other parasites and appendicitis to oxyuris vermicularis.

Conclusions. — An intestinal parasite causes appendicitis through its presence as a foreign body, and by its struggles may bring about a perforation and peritonitis where otherwise none would have occurred.

Tricocephalus dispar has been proved to cause an inflammation of the appendix by injuring the mucous membrane while sucking the blood of the host.

Ascaris lumbricoides has been found with a material similar to that in trichocephalus in its intestinal epithelium, and therefore is supposed also to attach itself to the mucosa of the host, and thus start the processes which result in appendicitis.

No proof has been found that oxyuris vermicularis causes an appendicitis, except in its role of foreign body.

XIX.

A CASE OF POST-TYPHOIDAL MYOSITIS OF THE RECTUS ABDOMINIS.

By David D. Scannell, M.D.

This case, which is reported through the courtesy of Drs. M. F. Gavin and J. B. Blake, of the Boston City Hospital, is, so far as I can discover, unique in the records of the subject up to the present time. It is unquestionably worthy of being placed on record, not so much, perhaps, for its singularity as for its importance in making one more addition to the already large list of differential possibilities in abdominal diagnosis.

Report of the Case.

D. C., male, aged 9, Italian, entered the Boston City Hospital May 20, 1901, and was assigned to the medical side with a diagnosis of typhoid fever. (Inasmuch as the main interest of the case lies in its surgical aspect, the medical history will be only briefly considered.)

There was an indefinite history of headache, malaise, loss of appetite, abdominal pain, and slight diarrhœa for nine days prior to entrance. On physical examination, the diagnosis of typhoid fever was readily made, the positive Widal and low white count confirming the clinical opinion. The patient was thought to be entering on the second week of the disease.

The boy's illness was a severe one, being attended in the first week of his stay in the Hospital by seven hemorrhages, all of moderate severity. Nine days after entrance there appeared an eruption on his abdomen, legs and buttocks, passing through the stages of papules, vesicles, pustules and crusts, and occurring in crops. Diagnosis of varicella was made.

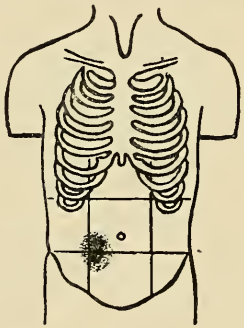
Twenty-seven days from the time of admission another complication in the form of furunculosis occurred, appearing mainly on the anterior abdominal wall, upper thighs and buttocks. Cultures from these showed staphylococcus pyogenes aureus and streptococcus pyogenes; no bacillus typhosus.

Twelve days later there developed a right ischio-rectal inflammation, with considerable induration, for which the patient was transferred to

the surgical side. Five days later an incision was made, and a small amount of pus evacuated. Culture showed mixed infection; no bacillus typhosus. The local inflammation rapidly subsided, and on July 22, a little over two months from the time of entrance, the boy was discharged well.

Five days later the patient was brought back to the Hospital, his interval history having been as follows: On the day after discharge, profuse diarrhœa with a small amount of blood in the stools; slight general pain in the abdomen, most marked in umbilical and hypogastric regions; on the day following, several chills and slightly increased hypogastric and right iliac pain; no fever, nausea or vomiting. From this time until his entrance to the Hospital there was a steady increase in the local pain; occasional chills and constant fever; occasional nausea and vomiting; slight constipation. It should be noted that during this entire time the boy had been confined to bed; there was no account of heavy straining or sudden forcible movements, such as might come from unusual exercise.

Physical examination on entrance: T. 100.2°; P. 134 (fair volume and tension); boy looked sick and anxious; tongue coated; dorsal decubitus



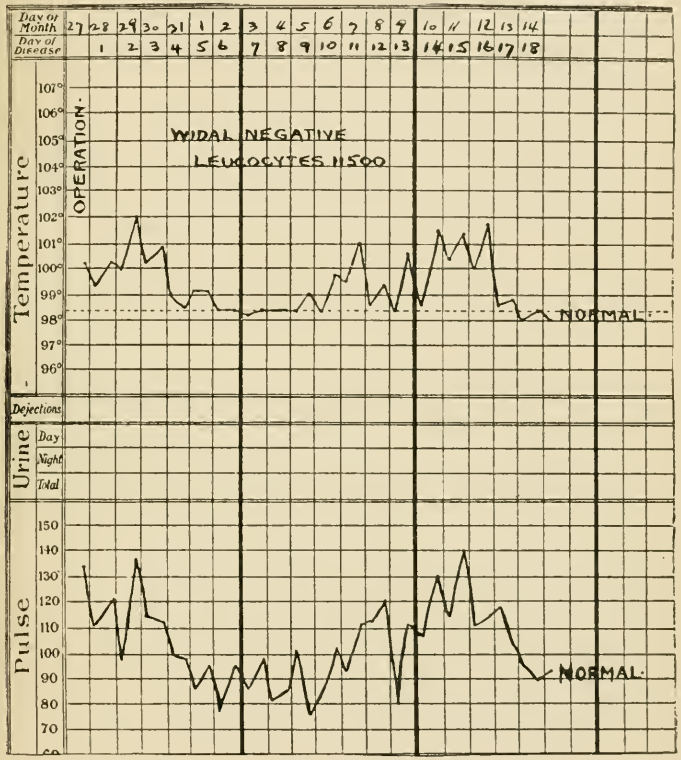
with thighs flexed on abdomen; chest negative; front of chest and abdomen presented many small crusted areas from previous furuncles.

Abdomen slightly distended; involuntary spasm more or less general, but especially marked in lower right abdomen and hypogastrium; tympanitic except in this same area, where it was dull to percussion. Exact palpation, because of the spasm and excessive tenderness, was impossible; but there was to be felt, notwithstanding, a fairly definite mass occupying area figured in diagram. Movements of the diaphragm and extension of the thighs caused increased local pain. In some respects the sensation on palpating suggested a full bladder, somewhat deviated to the right. No rectal examination was made. During the making of the physical examination the patient vomited several times; vomitus not significant. Widal negative; urine normal.

Entrance treatment (in the form of a high turpentine enema) effected no change in the abdominal condition, nor in the subjective symptoms of the patient. The diagnosis of acute perforative appendicitis, with abscess formation, seemed a reasonable one, and, in view of the boy's

apparently septic condition, immediate operative interference was decided on.

Under ether, with the abdominal muscles relaxed, the question of a full bladder again strongly suggested itself; catheterization resulted in nothing; muscle-splitting incision by Dr. Blake over McBurney's point. The peritoneum showed no injection, and the appendix was found to be normal. Exploration of the intra-abdominal surface of the anterior belly-wall revealed an ovoidal, indurated, non-fluctuant, extra-peritoneal thickening of the right rectus muscle in its lower third, extending



from just below the umbilicus to just above the symphysis pubis. The upper limit of induration was fairly sharply defined by the semilunar fold of Douglas. In the immediate neighborhood of this swelling of the rectus there was apparently a slight involvement of the transversalis and internal oblique muscles. The appendix was removed, and the wound closed with layer sutures. No steps were taken at the time to make a second incision into the indurated mass for the purpose of making a histological and bacteriological examination. It is a source of regret that this was not done.

July 29 (second day after operation). No improvement in any respect, the abdominal condition remaining as at time of entrance. Reference to the chart is of interest.

August 2 (sixth day). Operation wound healing perfectly. Despite the drop in pulse and temperature, the spasm, induration, and tenderness still persist in lower right abdomen.

August 6 (tenth day). Induration slightly diminished; spasm and tenderness unchanged, however; general condition excellent; wound firmly healed.

August 9 to 12, inclusive (thirteenth to sixteenth day). During this period almost a complete duplication of the clinical picture as presented at the time of admission; acute abdominal pain, involuntary spasm, dullness to percussion, and palpable mass in right lower quadrant. There is no obvious cause elsewhere in the patient for the marked rise in temperature and pulse.

From this time on there was a progressive diminution in the parietal induration, until finally by August 20 (twenty-four days after the operation) it had completely disappeared; there was a coincident disappearance of symptoms; on August 23 (twenty-seventh day) the boy was discharged well, and has remained so since.

Myositis, as a complication or sequela of typhoid fever, is a fairly well recognized condition, although its occurrence must be regarded as rare. Reference to the various works on the practice of medicine and surgery throws almost no light on the subject, the great majority omitting even its mention, and the few giving it only passing comment. Investigation of miscellaneous literature shows an entire absence of recorded cases of involvement of the rectus abdominis. As a fair index of the rarity of post-typhoidal myositis it is of interest to note that Osler,[1] in a relatively recent compilation of a large number of cases of typhoid fever (829 in all), mentions the occurrence of the condition either as a complication or a sequela only once; in this instance the calf muscles were affected. This must be taken to represent a fairly universal medical experience. Correlatively with this carefully observed series of cases we have the extensive surgical observations of Keen,[2] who, in over 900 carefully annotated cases, has not found the condition occurring once. It would be difficult to find two more significant series, representing in combination nearly 1,800 cases of typhoidal infection.

[1] Johns Hopkins Hospital Reports: Studies in Typhoid Fever. Nos. I., II., III.
[2] Surgical Complications and Sequels of Typhoid Fever.

The report of this particular case does not require any incidental consideration of post-typhoidal lesions occurring by predilection in the rectus abdominis; such as, for example, waxy or granular degenerative changes, or hematoma, a condition not uncommon, and usually preceded by some form of degeneration.

XX.

ANOMALIES IN THE CIRCLE OF WILLIS, WITH THE REPORT OF A CASE.

By Walter C. Howe, M.D.

Anomalies in the course and distribution of arteries may have a distinct surgical interest: the case here reported presents a rare deficiency in the vessels at the base of the brain of particular interest anatomically.

The patient was on the service of Dr. H. L. Burrell, to whom I am indebted for the privilege of reporting the case: I wish to thank Dr. Thomas Dwight for valuable suggestions, and Dr. Councilman and Dr. Mallory for allowing me to consult the pathological records.

The arteries at the base of the brain were described and figured with more or less accuracy by Vesalius (1) and by Casserius (2). Thomas Willis (3) first recognized the importance of the communicating arteries and named them. The plates of Vieussens (4) and of Bidloo (5), about contemporary with Willis, show the circle well; but Haller (6) was the first anatomist who described with precision the arterial circle ascribed to Willis, and who represented its branches accurately in his plates. Haller was disposed to detract from the fame of Willis's discovery; "Thomas Willisius ad Carotidum historiam non plurima addidit, neque circulum, qui ipsi tribuitur, melius Casserio pinxit" (7). The clearest and most exact plates of the Circle of Willis, among the older anatomists, are those of Vicq d'Azyr (8).

It will be remembered that the blood supply to the brain comes through the carotid and vertebral arteries: "arteriæ sunt quatuor, scilicet duæ carotides et duæ vertebrales,"

says Willis. As the blood comes directly from the heart,* a sharp bend in the course of both the carotids and the vertebrals as they enter the skull serves to retard the blood-current and preserve the brain from undue violence. The Circle of Willis serves further to retard the current; but its principal object is to ensure an uninterrupted circulation to the cerebral hemispheres; the pons, medulla and cerebellum being supplied by branches of the basilar artery and vertebrals. In consequence of the free anastomosis furnished by the Circle of Willis, it follows that obstruction on the cardiac side of the Circle does not interfere with the cerebral circulation; in dogs, it is not until all the four vessels leading to the Circle of Willis have been tied that symptoms of arrested cerebral circulation appear (9). In man there have been reported cases in which both common carotid arteries were tied, with recovery (10).

Sappey has termed the Circle of Willis a hexagon; Testut enumerates the vessels which form it, and urges that it is a heptagon; Duret says that ten, sometimes twelve arteries, enter into its formation, and it is best known as the polygon of Willis. It is formed in front by the anterior cerebral arteries, arising from the internal carotid on either side at the inner extremity of the fissure of Sylvius: they run nearly horizontally forwards and inwards above the optic nerve in the great longitudinal fissure between the cerebral hemispheres. Anteriorly, the circle is completed by the anterior communicating artery, a transverse vessel, usually two lines in length, connecting the two anterior cerebrals in front of the optic chiasma as they enter the longitudinal fissure. Laterally, the circle is formed by the posterior communicating arteries, arising from the internal carotid artery, on either side, before the latter divides into the anterior and middle cerebral arteries. The posterior communicating anastomose with the posterior cerebral arteries, which are formed from the bifurcation of the basilar, and complete the polygon posteriorly.

* Le cerveau est le plus sensible des organes et il reçoit le premier de tous l'influence de la circulation du sang.—Claude Bernard. (Leçons sur les tissus.)

It is not within the province of this paper to describe the method of distribution of branches of the Circle of Willis in the central ganglionic system, nor to discuss the work of Duret (11), Heubner (12), Lucas (13), Browning (14), and others as regards the question of peripheral anastomoses in the cortical arterial system: Lucas demonstrated in the cortical system, communicating arterioles having a diameter of 0.25 m.m. Given an occluded vessel distal to the Circle of Willis, the peripheral anastomosis in the cortical system is often not sufficient to maintain nutrition: the vessels in the central ganglionic system have no anastomoses, and are what Cohnheim has called "terminal arteries." As Dwight (15) metaphorically puts it, "this great outwork (the Circle of Willis) once passed, the citadel falls and softening results." The Circle of Willis comprises all the communications readily demonstrable between the two hemispheres.

The arteries forming the Circle of Willis vary greatly in size in different subjects, and on the two sides of the same subject (16). Anomalies and deficiences are not particularly rare; the case here reported presented an anomaly which has not been noted previously; death resulted after ligature of the common carotid, owing to absence of all communicating arteries and consequent failure of collateral circulation.

The patient was an Italian laborer, 35 years of age; he had always been well, and his previous history is of no interest. He entered the City Hospital February 12, 1903.

Six weeks before, small swellings had appeared in each side of the neck; that on the right side increased very little in size; the one on the left grew very rapidly in all directions, and for a few days previous to entrance had caused some difficulty in breathing. He had no pain, and the swellings were not tender.

Physical examination showed a well-developed man, presenting nothing abnormal except the tumors in the neck and several small palpable inguinal glands. In the right side of the neck was a freely movable firm tumor, not reddened nor tender, about the size of a walnut. In the left side of the neck, extending from the ramus of the jaw to the clavicle, and from the mastoid behind to the median line in front,

was a uniformly firm tumor mass; it was slightly movable; the overlying skin was not reddened. The mass pushed the trachea slightly to the right. (Fig. 1.)

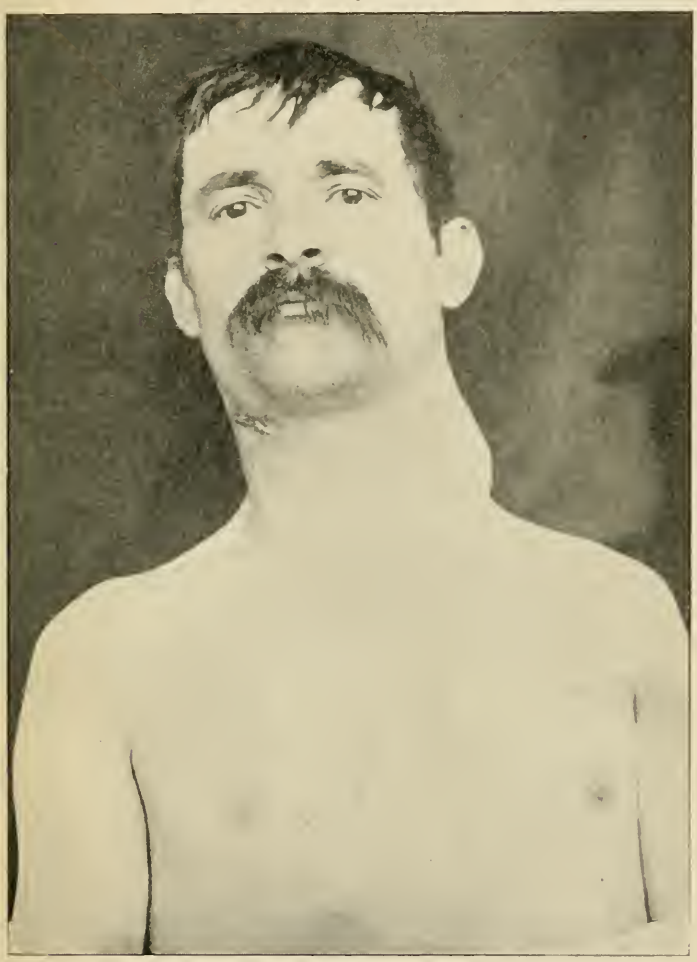


FIG. 1.

The gland on the right side was removed for purposes of diagnosis; the report of the pathologist was Malignant Lymphoma (Lymphosarcoma).

February 19, 1903, operation, Dr. Burrell. On the left side of the neck incision beginning at the tip of the mastoid process, extending downwards and inwards to the sternal notch; from this latter point incision carried in a more or

less horizontal direction along the border of the clavicle a distance of about three inches. Skin flap elevated and reflected, exposing the tumor. The mass was closely adherent to all the structures of the neck; the common carotid artery was developed and ligated; in freeing the tumor the artery was cut, necessitating another ligature, and about two inches of the vessel was removed between ligatures. The left lobe of the thyroid was removed with the tumor; a small mass was removed from below and behind the clavicle. The incision was closed with sutures of silkworm gut.

During operation the patient stopped breathing, and respiration was with difficulty restored and maintained. At the end of operation patient's condition was poor, but there was steady improvement for twelve hours, at the end of which time he apparently understood what was said to him, but could not be made to talk. Nineteen hours after operation, patient began to have periods of stertorous respiration, and to show spasmodic contraction of the muscles of the left side. The left pupil was much dilated; at times there was complete paralysis of the right side of the face and the right extremities. In the intervals between these attacks the patient was semi-conscious; the pulse was of poor quality, 132 to 140. He responded to supra-orbital pressure by contraction of the muscles of the left side.

Twenty-four hours after operation the patient became unconscious, the respiration was Cheyne-Stokes in character; the left pupil was very much dilated, the right pupil remained about 2 mm. in diameter; all the muscles of the extremities showed tonic contraction. There was profuse perspiration of the right side of the face, sharply limited by the median line. The patient died twenty-eight hours after operation.

The autopsy was done 41½ hours post-mortem. Body of a well developed, well nourished white man. Marked rigor mortis. Slight lividity of dependent parts. Pupils equal and dilated 5 mm. On the left side of the neck extending from the mastoid process downward and inward parallel to the sterno-cleidomastoid muscle, and reaching to the sternal notch is an incision 13 cm. long. An incision likewise

begins at the sternal notch, extends outward along the border of the clavicle for a distance of 7 cm. Both incisions are sewed with silkworm gut stitches.

Peritoneal Cavity. — Surfaces smooth and glistening. No increase of fluid. Mesenteric lymph nodes slightly enlarged. On section grayish white in appearance. Appendix 6 cm. in length, free of adhesions, provided with mesentery throughout, and points upward and inward. Diaphragm reaches to the fifth rib on the left, sixth interspace on the right.

Pleural Cavity. — Free of adhesions.

Pericardial Cavity. — Surfaces smooth and shining. Pulmonary artery opened in situ, contains cruor clot and dark fluid blood. Normal amount of straw-colored fluid in cavity.

Heart. — Weight, 310 gms. Measurements: Tricuspid valve, 9 cm.; pulmonary valve, 7 cm.; mitral valve, 8 cm.; aortic valve, 7.5 cm.; left ventricle, 1.5 cm.; right ventricle, 0.7 cm. Epicardium, myocardium, endocardium, and valves normal.

Fresh section shows: *Lungs* dark red in color, usual carbon markings. Lower lobes on section dark red; slight pressure brings forth considerable frothy fluid.

Spleen. — Weight, 110 gms. Capsule dark purple in color, wrinkled. Substance dark red. Malpighian bodies not easily distinguishable. Trabeculæ not increased. Knife scrapes away very little pulp. *Gastro-Intestinal Tract.* — Normal throughout. *Pancreas.* — Appears normal. *Liver.* — Weight, 1,640 gms. Capsule reddish purple, smooth. Substance normal in appearance. *Kidneys.* — Weight, 330 gms. Strip readily. Cortex easily differentiated from the pyramids. Glomeruli appear as minute grayish white points. Fresh section shows: *Adrenals.* — Normal. *Bladder.* — Normal. *Genital Organs.* — Normal. *Aorta.* — Shows slight sclerotic changes. Bone marrow of tibia yellow, and of normal appearance. Bone marrow of femur of a deep reddish chocolate color.

Scalp and *Calvarium* normal. *Dura* tense on both sides, somewhat tenser over right hemisphere. Arachnopial villi evident upon outer face of dura, especially upon right side,

as low, dark red, resilient elevations, pea-size. Sinuses contain fluid blood and loose cruor clot. Dura strips readily, leaving parallel rows of congested villi, somewhat more extensively developed than normal, fore-and-aft. *Pia.* — Normal; coarse veins of sulci moderately injected, on the two sides evenly, but less prominent against the œdema of the left cortex. *Convolutions* of right hemisphere flattened, of left hemisphere bulging and soft.

FIG. 2.

Basal Vessels are without macroscopic trace of sclerosis. Posterior communicating branches of Circle of Willis are impervious fibrous threads, left 0.05 mm. in diameter, right somewhat smaller. Anterior communicating branch absent. The pervious vessels are all empty, or contain a little cruor clot. Straight branches of the major arteries present in normal numbers. (Fig. 2.)

Brain weighs, after escape of insignificant amount of fluid, 1,720 gms. Hemispheres taken separately, after cutting through the peduncles, weigh:

Right hemisphere . . .	580 gms.
Left hemisphere . . .	740 gms.

When the brain is spread on a board the left hemisphere flattens perceptibly out and bulges 0.5 cm. beyond its fellow. It is also evident that a median sagittal section would fall 0.5 cm. within the territory of the left hemisphere. There is an oval area of diffuse pink injection, thumbnail-size, upon the under surface of the left frontal lobe; this area is of the same consistency as the rest of the hemisphere, and the bright color quickly pales out in the underlying substance.

Cortex of left hemisphere boggy, darker, and slightly more translucent than substance of right hemisphere. White matter of left side gives a kind of "blanc-mange effect," in plain contrast with normal medullary appearance upon right side. Ventricles and ependyma normal.

Carotid artery above ligatures contain cruor clot.

Middle ears normal. Diploe of temporal bone red.

ANATOMICAL DIAGNOSIS.

Hypostatic congestion of lungs; slight arteriosclerosis; excision of the left common carotid artery for a space of about 7 cm.; oedema and softening of left hemisphere; anomaly of Circle of Willis preventing collateral circulation.

The principal anomalies which have been reported will be here described under the head of each of the arteries forming the circle. Windle (17) found the normal arrangement in 119 out of 200 cases: in forty-three of these cases there was well-marked inequality in the size of the posterior communicating vessels.

The Anterior Communicating Artery. — Quain says it is double in 7 per cent. of the cases; this is its most common abnormality: of Windle's 200 cases, fourteen were double. Barbieri (18) reports twenty cases of abnormal cerebral circulation, in which he found the artery double once, single

and abnormally large eight times, filiform twice, impervious once, entirely absent once, and normal seven times. Windle found it normal 159 times in 200 cases: incompletely double, *i.e.*, forked at one extremity, in six cases: absent in eight. In one case three communicating arteries were found. Barkow (19) mentions that the vessel may give off an accessory anterior cerebral; Windle found this present in nine cases. When the vessel is double, one is usually of normal size, the other very small.

The anterior cerebral arteries; according to Theile (20) the two vessels may be united into a single trunk, or the two may arise from one carotid, in which case the two posterior cerebrals arise from the other carotids. Lloyd (21) reports such a case. According to Bullen (22) either vessel may be replaced by two small trunks, or the vessel may be wanting, its region being supplied by branches of the other anterior cerebral. If only one vessel is present, it is usually the left; a third anterior cerebral is present, arising from the anterior communicating, in 4.5 per cent. of the cases, according to Quain; of Windle's (17) 200 cases, 181 showed normal anterior cerebral vessels. In one case the vessel of the right side was absent, its area of distribution being partly supplied by small branches from the corresponding vessel. In one case the right was twice the size of the left; in one case the two anterior cerebrals united to form a single trunk, which ran as such to its termination; in eight cases the two vessels united for a short distance, six times replacing, and twice accompanying the anterior communicating. Finally, an anomaly has been described, in which both the anterior cerebrals and anterior communicating were absent, and the two carotids united directly (23).

The middle cerebral arteries are the most direct continuation of the internal carotids. If the posterior communicant vessel arises from the middle cerebral, as is not uncommon, the middle cerebral artery forms part of the circle — usually for a distance of 4–6 mm. If, on the other hand, the posterior communicating arises directly from the carotid (and this is the usual arrangement), that portion of the carotid

from the origin of the post-communicant to its division into anterior and middle cerebrals, may be regarded as forming part of Willis's circle. Meckel states that the two middle cerebrals not unfrequently arise from the right carotid — in which case the anterior cerebral comes from the left carotid.

The posterior communicating arteries show many variations; often the vessel is so large that the posterior cerebral may be considered as arising from the internal carotid rather than from the basilar, to which latter it is connected by only a slender vessel; Quain says this occurs on the right side in 5.5 per cent. of the cases, on the left side in 4.5 per cent. Webber (24) reports such a case, in which the left posterior communicating vessel was twice the usual diameter, and the left posterior cerebral half the usual diameter before it was joined by the posterior communicant; in this case the middle cerebrals were normal. Absence of both posterior communicants seems to be rare; Meckel says it is one of the rarest anomalies. Of Windle's 200 cases, leaving out of consideration disparity in size (43 cases), the posterior communicants were normal in 175 cases. The vessel of the right side was absent in 9; of the left, 13; of both sides, in 3. In 28 cases the right vessel was larger than the left; in 15 the left was larger than the right.

The posterior cerebral arteries. According to Bullen, either vessel may be absent, may be a branch of the carotid system, may be replaced by a large posterior communicant, or be replaced by two small vessels from the basilar. Of Windle's 200 cases, 173 showed normal posterior cerebrals. The left was derived from the corresponding carotid nine times; the right had a corresponding origin eleven times. The two posterior cerebrals had origin on the same side of the brain, one from the basilar and one from the carotid, three times. If the communicating vessels are absent, as in the case here reported, there is not usually complete lack of communication between the two arterial systems; there is commonly a certain slight anastomosis of small branches; such communication was, however, insufficient to preserve nutrition in this case.

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XXI.

A TABLE FOR OPERATIONS UPON THE KIDNEY THROUGH THE LUMBAR INCISION.

By John H. Cunningham, Jr., M.D., formerly House Surgeon.

To reach the kidney through the lumbar incision, the patient is placed on one side and canted slightly forward so as to expose the region to be attacked.

Two forces will aid the operator in exposing and delivering the kidney onto the loin. The first, and perhaps the most important, is a force directed toward increasing the space between the crest of the ilium and the lower border of the ribs. The second is a force applied from in front at the proper height and level to exert pressure upon the anterior surface of the kidney, and carry it backward and upward against the field of operation.

These two forces are important in kidney operations through the lumbar incision because of the anatomical situation of the organs. In brief, the kidneys are situated in the posterior part of the abdomen, imbedded in areolar tissue. They are post-peritoneal, not firmly fixed, but held in position by the peritoneum, areolar tissue, peri-renal fascia and the renal vessels. They lie on a level with the bodies of the last dorsal and first two or three lumbar vertebræ, the right a little lower than the left.

From a posterior aspect, the kidneys are under cover of the eleventh and twelfth ribs and the lower border of the diaphragm. About one-fifth of the left and a little more of the right kidney extends below the twelfth rib and the lower border of the ligamentum arcuatum internum of the diaphragm, as it stretches across from the last rib to the transverse processes of the first and second lumbar vertebræ.

Thus a *direct* avenue to the kidney, without cutting away parts of the last two ribs, or without the risk of opening the pleural cavity, is impossible.

The kidney must therefore be attacked through the space between the lower border of the ribs and ligamentum arcuatum internum and the crest of the ilium.

The width of this space is about two fingers' breadth in the male and a little more in the female. Normally, about the lower fifth of the kidney occupies the upper part of this space, but when the organ is freely movable or enlarged it may occupy a greater area.

To increase the width of this space the patient is usually placed on one side over sand bags or an Edebohl air cushion. Either of these being placed just above the crest of the ilium acts as a fulcrum, partially uncovering the kidney and widening the space by lifting the lower border of the ribs upward.

The position, however, is an unsteady one, and usually requires two assistants other than those engaged in the operation.

With the patient in the desired position there is a tendency for the kidney in question to fall forward and toward a median line. Therefore the second force must be applied, that is, pressure from in front on the anterior surface of the kidney, so that the organ is forced upward and backward against the field of operation.

The objections to doing kidney operations upon the Edebohl air cushion or upon sand bags are, that too much help is required to maintain the position; that the force exerted upon the anterior surface of the kidney must be manual, and is, therefore, often misdirected and seldom constant; that the full limits of the space are seldom attained; and that the increased number of assistants required to maintain the position multiplies the opportunities for faulty asepsis.

With the view of avoiding the objections to which the methods at present in use are open, as stated above, the writer has devised a table to hold the patient in the desired position and at the same time exert the two necessary forces, thereby doing away with assistants other than those directly connected with the operation.

The table is practically a double incline plane. It consists of an upright base, 10 inches high by 20 inches wide, and is 2¼ inches thick, except at the top, where it is a little less, as the edges are rounded. On top of the upright there are two series of three holes. Each series 2, 3, and 5 inches respectively from either end. (A, Fig. I.)

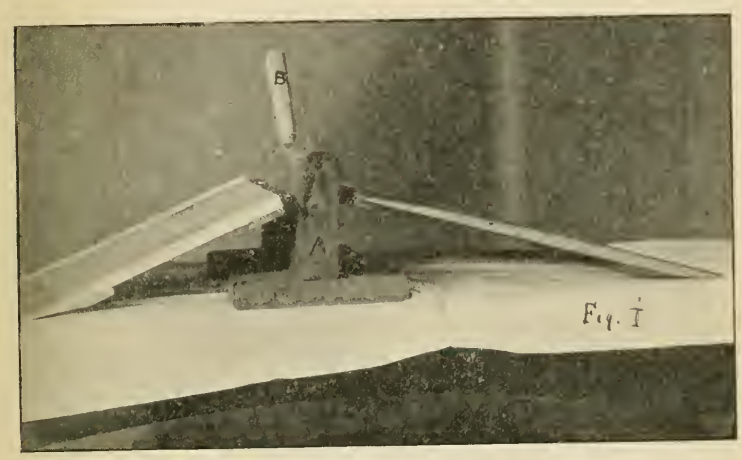

Fig. 1

The holes are bored at an angle of 30 degrees and are 3 inches deep by 1¼ inches wide, and into any one of these may be fitted a stake of wood, which rises 7 inches above the surface. (B, Fig. 1.)

There are two inclines, which are fastened to either side of the upright by hooks and rings at a distance of either 3 or 5 inches from the top. (C, Fig. 1.) The larger incline is 25 inches long by 20 inches wide, and the smaller 18 inches long by 20 inches wide.

The apparatus may be put on any table.

The stake is placed in one of the holes of either series, according to the side to be operated upon. Unless the patient be corpulent it is best placed in one of the holes nearest the centre.

In the majority of cases the inclines should be fastened to the upper rings; but there are occasional cases where the patient is so large that the inclines must be suspended from the lower rings in order to open the space to its full extent.

One folded sheet placed on the upright and another partially opened and made to extend from the upright over the stake and inclines will be sufficient padding.

Having arranged the stake, inclines, and padding, the patient is placed upon the table so that the upright is just above the iliac crest and the abdomen snug against the stake. That the upright be just above the iliac crest and the patient close against the stake is all-important, because in this lies the success of obtaining the action of the two forces before mentioned.

The legs, which are on the long incline, should be flexed. This forces the patient still more firmly against the stake, increasing the pressure upon the kidney, and forcing it upward and backward against the field of operation. It also makes the position steadier. (Figs. 2 and 3.)

If the patient is properly placed upon the table, the space is opened to its full extent, and the tissues in the field of operation are on the stretch.

After the incision is carried down to the peri-renal fascia the kidney and its surrounding tissue tend to bulge into the wound, and the excursion of the organ is found considerably lessened. After the peri-renal fascia is opened, a movable kidney without adhesions is forced out of the wound onto the loin with no other aid than the weight of the patient's body against the stake. If, as occasionally

occurs, the organ is adherent to the surrounding parts, it does not present outside the wound without aid; but is, however, more easily delivered onto the loin because of the properly directed force from in front.

There is no tendency for the kidney to fall back into the wound after being once delivered unless the patient be rolled away from the stake, when it will quickly disappear deep below the surface. It will reappear, however, by allowing the patient to fall back upon the stake.

Fig 3.

In most lumbar renal operations it is very desirable to be able to deliver the kidney through the outer wound and to keep it on the loin during some, at least, of the succeeding steps. The present device facilitates inspection and palpation, economizes assistance, and simplifies what is at best a somewhat difficult operation.

No post-operative discomfort or lameness of the part has been observed in the limited number of cases in which the table has been employed.

The table affords certain minor points of advantage. In operations upon both kidneys, as, for example, double decapsulation, the patient may be placed face downward with the front of the abdomen resting upon the upright, so padded as to open the lumbar spaces of both sides and force the kidneys back equally well, if not better, than sand bags or the Edebohl air cushion. Also, it does not sink into the whole

upper part of the abdomen and press upon the diaphragm as does these other two means. Thus the excursion of the diaphragm is not interfered with, and the patient's breathing is therefore more easy.

In gall-bladder operations, and also in laminectomy, the table may prove of considerable service; in the former by affording a means of getting under the ribs, and in the latter by maintaining a firm position and making more prominent the area to be attacked.